

PCWORLD

MARCH 1989 \$2.95 CANADA \$3.95

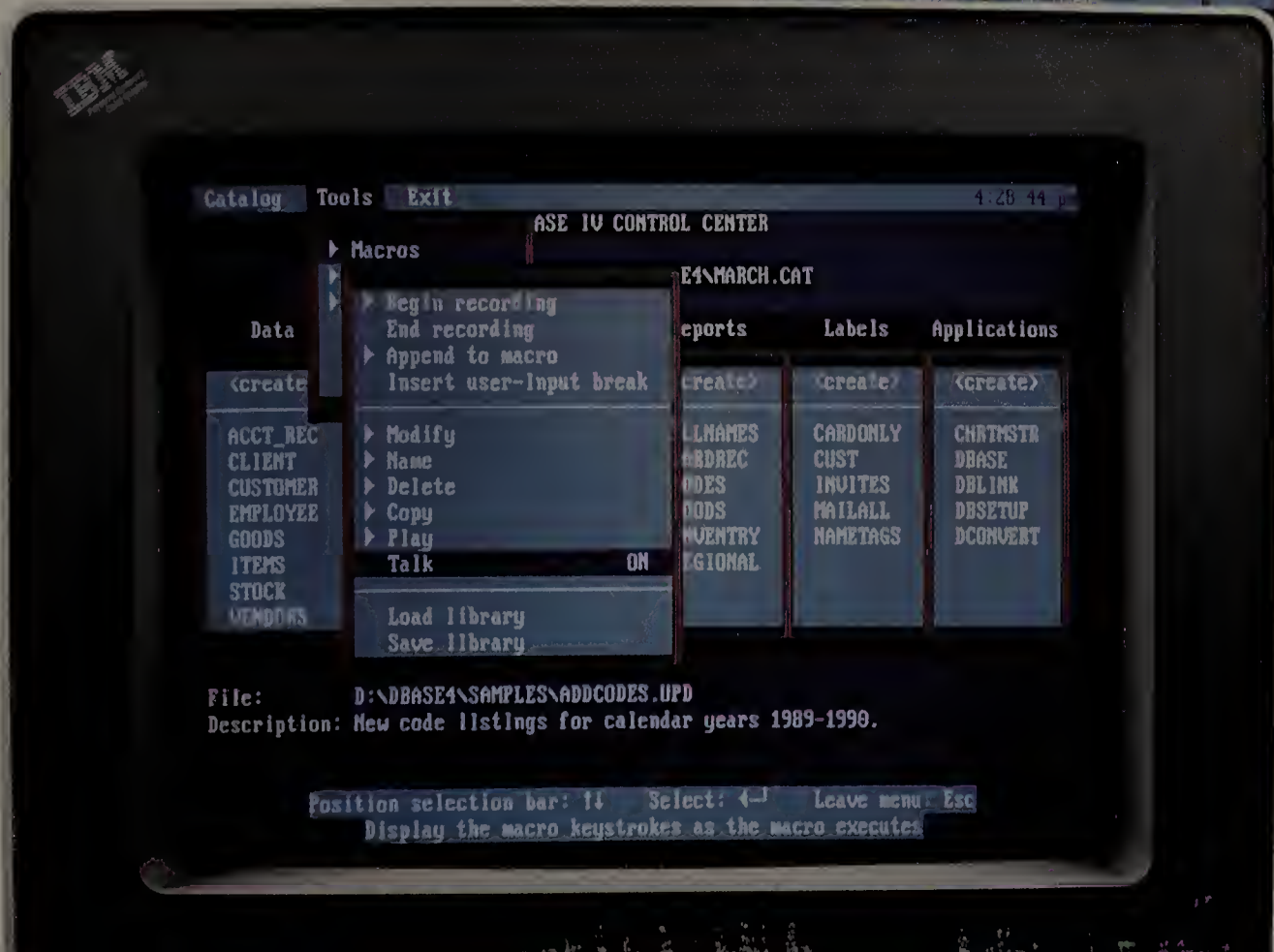
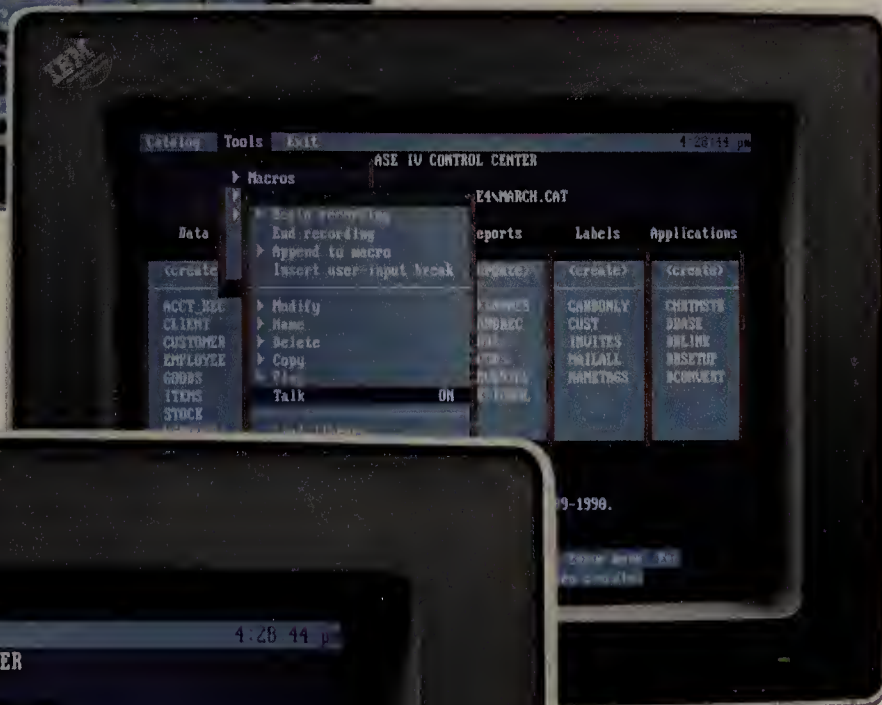
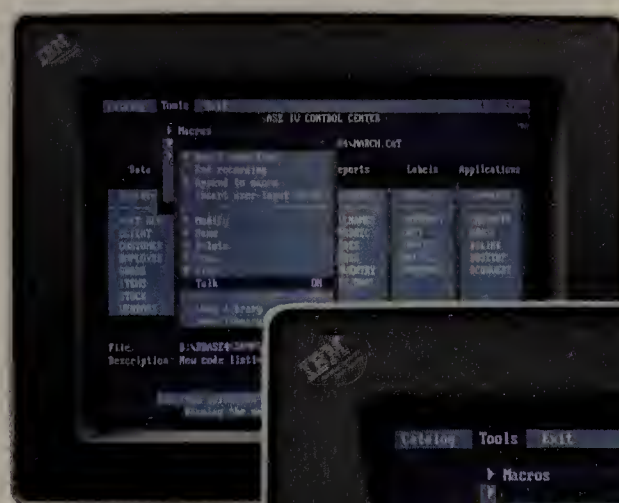
CAN dBASE IV BUST THE CLONES?

**OS/2 DATA
BASES**
Ready for
prime time?

**LOW-COST
ACCOUNTING**
Balance the
books for less

WE TEST

- POWER
- PERFORMANCE
- EASE OF USE



HOW TO

- DESIGN A DATA BASE
- PRINT R:BASE REPORTS
- SPEED UP PAGEMAKER
- WRITE CASL PROGRAMS

WHY YOU SHOULD
CONSIDER THE
DELL 386 SYSTEMS,
DESPITE THEIR
SUSPICIOUSLY LOW
PRICES.



Our 386-based systems are priced about 35% less than comparable systems—like Compaq's. Which may make you wonder if we've left something important out. Like high performance.

Well we haven't.

In fact, these are among the fastest 386-based systems available. With more advanced features than you'd get in systems that list for up to \$3000 more.

Like Compaq's.

For instance, our 20 MHz System 310 offers you the best value available in any 386-based system. PC Magazine (6/14/88) describes it as "fast enough to burn the sand off a desert floor."

AND IF THAT SOUNDS FAST, WAIT TILL YOU SEE OUR NEW 25 MHz 386-BASED SYSTEM.

At 25 MHz, our new System 325 offers you the highest possible performance in a 386. Like the System 310, it utilizes the very latest technology, including the Intel 82385 Cache Memory Controller, advanced 32-bit architecture and high performance drives. And of course, both systems are fully IBM PC compatible. (For more detailed specifications, see the inside pages.)

But speed isn't the only reason to buy from us. Or even the best reason.

THE FIRST PERSONAL COMPUTER THAT'S TRULY PERSONAL.

Dell configures systems to your own personal specifications. After an

evaluation of your needs, we'll help you select the features that are right for you. After your system unit is custom built, we'll burn-in everything, add-in boards and all, to make sure the entire system works perfectly.

TOLL-FREE SUPPORT AND ON-SITE SERVICE INCLUDED IN THE PRICE.

Every Dell system includes the Dell System Analyzer, a complete set of diagnostic tools. Which lets Dell's expert technicians resolve problems right over the phone. This toll-free support service is available from 7 AM to 7 PM (CT) every business day, at no extra charge.

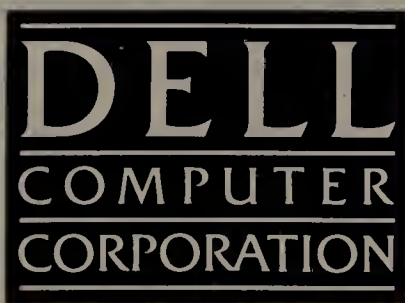
And if your system requires hands-on service, a technician will be at your location the next business day. At absolutely no charge to you. Because included in the price of your system is a full year of on-site service.

But that's not all. You also get our 30-day money-back guarantee. As well as our one-year limited warranty on parts and workmanship.

AND IF YOU STILL THINK YOU GET WHAT YOU PAY FOR, CONSIDER THIS.

When you buy or lease from Dell, you buy directly from our manufacturing facility in Austin, Texas. Which means we eliminate dealer markups, allowing us to give you a lot more 386 for less.

This same principle is behind all the Dell systems. Review them in detail. Then call us at (800) 426-5150 to order the system that's right for you.



TO ALLAY YOUR SUSPICIONS

YOUR TOTAL SATISFACTION IS GUARANTEED.

Dell offers a complete line of systems, peripherals and software.

And whatever you choose, you must be absolutely, totally satisfied with it. If not, simply return it within the first 30 days for a money-back refund. No questions asked. We call this our Total Satisfaction Guarantee.

SUPPORT IS A FREE PHONE CALL AWAY.

Also included in your system price is our toll-free support line. It's open every business day from 7 AM to 7 PM (CT). Simply dial (800) 624-9896.

ON-SITE SERVICE IS INCLUDED IN YOUR SYSTEM PRICE.

For those rare problems that can't be handled over the phone, we'll send a service technician to your location by the next business day. At absolutely no charge to you. Because included in system price is a year's worth of on-site service.

ONE-YEAR WARRANTY.

Dell offers a one-year limited warranty, which warrants each system we manufacture to be free of defects in materials and workmanship for one full year. During that period we will repair or replace any defective products returned to our factory.

For a lot of companies, leasing our systems is an even better idea because of the cash flow and tax advantages. And we guarantee fixed rates, so you know exactly how much to budget each month. We can even custom design a lease plan to fit the exact needs of your business.

For the complete terms of our On-Site Service Contract, Satisfaction Guarantee, Warranty and leasing plans, write: Dell Computer Corporation, 9505 Arboretum Blvd., Austin, Texas 78759-7299.



THE NEW 25 MHz
386 SYSTEM 325.

When you need the highest possible performance of any 386, this is the technology of choice. Running at 25 MHz, the System 325 is faster than the Compaq 386/25. Besides unequaled speed, it also offers Intel's Advanced 82385 Cache Memory Controller and high performance disk drives. As a result, it gives you workstation-level performance for CAD/CAM and desktop publishing applications. It's also especially effective as a network file server, and more than capable of handling the most complex spreadsheets and databases.

STANDARD FEATURES:

- Intel 80386 microprocessor running at 25 MHz.
- 1 MB of RAM* expandable to 16 MB using a dedicated high speed 32-bit memory slot.
- Advanced Intel 82385 Cache Memory Controller with 32 KB of high speed static RAM cache.
- Page mode interleaved memory architecture.
- VGA systems include a high performance 16-bit video adapter.
- Socket for 25 MHz Intel 80387 or 25 MHz WEITEK 3167 math coprocessor.
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Dual diskette and hard disk drive controller.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 200-watt power supply.
- 8 industry standard expansion slots.

OPTIONS:

- 25 MHz Intel 80387 math coprocessor.
 - 1 MB or 4 MB memory upgrade kit.
 - 2 MB or 8 MB memory expansion board kit.
- **Lease for as low as \$245/Month.**

System 325	With Monitor & Adapter	
Hard Disk Drives	VGA Mono	VGA Color Plus
150 MB-18 ms ESDI	\$6,799	\$7,099
322 MB-18 ms ESDI	\$8,799	\$9,099

The Dell System 325 is an FCC Class A device, intended for business use only.



THE DELL 20 MHz
386 SYSTEM 310.

For business users who need a 386 system, this is the best combination of performance and value available. Running at 20 MHz, this 32-bit system is faster than the IBM PS/2 Model 70 and the Compaq 386/20e. Since it has the same high performance disk drives and Intel Advanced 82385 Cache Memory Controller as our System 325, it brings a new level of performance to complex spreadsheets and databases. As you might expect, it runs windowed software at extremely high speed. It's also well-suited for desktop publishing applications, or as a network file server.

STANDARD FEATURES:

- Intel 80386 microprocessor running at 20 MHz.
- 1 MB of RAM* expandable to 16 MB using a dedicated high speed 32-bit memory slot.
- Advanced Intel 82385 Cache Memory Controller with 32 KB of high speed static RAM cache.
- Page mode interleaved memory architecture.
- VGA systems include a high performance 16-bit video adapter.
- Socket for 20 MHz Intel 80387 or 20 MHz WEITEK 3167 math coprocessor.
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Dual diskette and hard disk drive controller.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 200-watt power supply.
- 8 industry standard expansion slots.

OPTIONS:

- 20 MHz Intel 80387 math coprocessor.
 - 1 MB or 4 MB memory upgrade kit.
 - 2 MB or 8 MB memory expansion board kit.
- **Lease for as low as \$140/Month.**

System 310	With Monitor & Adapter	
Hard Disk Drives	VGA Mono	VGA Color Plus
40 MB-28 ms	\$3,899	\$4,199
90 MB-18 ms ESDI	\$4,699	\$4,999
150 MB-18 ms ESDI	\$5,199	\$5,499
322 MB-18 ms ESDI	\$7,199	\$7,499

PLEASE CALL 800-426-5150.



THE DELL 20 MHz 286 SYSTEM 220.

It's an 80286 system that's as fast as most 386 computers. But at less than half the price. Which means you get the best price/performance of any system. The System 220 runs at 20 MHz, with less than one wait state. It also features complete compatibility with Microsoft MS-DOS and MS OS/2, plus a remarkably small footprint. The System 220 is the ideal executive workstation.

STANDARD FEATURES:

- 80286 microprocessor running at 20 MHz.
- 1 MB of RAM* expandable to 16 MB† (8 MB† on system board).
- Page mode interleaved memory architecture.
- LIM 4.0 support for memory over 1MB.
- Integrated diskette and VGA video controller on system board.
- Socket for Intel 80287 math coprocessor.
- One 3.5" 1.44 MB diskette drive.
- Integrated high performance hard disk interface on system board.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports integrated on system board.
- 3 full-sized industry standard expansion slots available.

OPTIONS:

- External 5.25" 1.2 MB diskette drive.
- 3.5" 1.44 MB diskette drive.
- Intel 80287 math coprocessor.
- 1 MB RAM upgrade kit.

**Lease for as low as \$85/Month.



THE DELL 12.5 MHz SYSTEM 200.

A great value in a full-featured AT compatible. An 80286 computer running at 12.5 MHz, this computer is completely Microsoft MS-DOS and MS OS/2 compatible. The System 200 offers high speed drive options, industry standard compatible BIOS and on-site service. As Executive Computing said of this computer's predecessor, "If faster processing speed and low cost are two key issues affecting your purchase decision, this machine might be the ideal choice for your office."

STANDARD FEATURES:

- 80286 microprocessor running at 12.5 MHz.
- 640 KB of RAM expandable to 16 MB† (4.6 MB† on system board).
- Socket for Intel 80287 math coprocessor.
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
- Dual diskette and hard disk drive controller.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 200-watt power supply.
- 6 industry standard expansion slots.

OPTIONS:

- Intel 80287 math coprocessor.
- 512 KB RAM upgrade kit.

**Lease for as low as \$99/Month.

*PERFORMANCE ENHANCEMENTS (SYSTEMS 325, 310 AND 220):

640 KB is available for programs and data. The remaining 384 KB is reserved for use by the system to enhance performance.

†Using 1MB SIMMs. Inquire as to availability.

System 220	With Monitor	
	VGA Mono	VGA Color Plus
One Diskette Drive	\$2,299	\$2,599
40 MB-29 ms Hard Disk	\$2,999	\$3,299
100 MB-29 ms Hard Disk	\$3,799	\$4,099

System 200	With Monitor & Adapter	
	VGA Mono	VGA Color Plus
40 MB-28 ms	\$2,699	\$2,999
90 MB-18 ms ESDI	\$3,499	\$3,799
150 MB-18 ms ESDI	\$3,999	\$4,299
322 MB-18 ms ESDI	\$5,999	\$6,299

LASER PRINTERS AND MORE.

The obvious companion for a high performance Dell system is a Dell laser or dot matrix printer. All printers come with 30-day money-back guarantee. And be sure to ask about our software offerings, which include most popular third-party applications as well as Dell Enhanced operating system software.

LASER PRINTERS.

Laser System 150, 15 pages per minute:	\$5,995.
Laser System 80, 8 pages per minute:	\$3,295.
Laser System 60, 6 pages per minute:	\$2,195.

All Dell laser printers come with 1.5 MB RAM, full-page 300 DPI graphics, and have 31 standard fonts (7 resident and 24 down-loadable from diskette). Dell laser printers also provide Hewlett-Packard LaserJet, Epson/FX, IBM Proprinter and Diablo 630 emulations.

DOT MATRIX PRINTERS.

Printer System 800:	\$699.95.
---------------------	-----------

Our highest resolution text and graphics, 24-pin dot matrix printer. Draft quality at 200 cps. Letter quality at 66 cps.

Parallel and serial interfaces. Wide carriage.

Printer System 600:	\$499.95.
---------------------	-----------

9-pin dot matrix. Draft quality at 240 cps. Near-letter quality at 60 cps. Parallel interface. Wide carriage.

Printer System 300:	\$199.95.
---------------------	-----------

9-pin dot matrix. Draft quality at 144 cps. Near-letter quality at 36 cps. Four standard fonts. Parallel interface. Narrow carriage.

OPERATING SYSTEM SOFTWARE.

Dell Enhanced Microsoft® MS-DOS® 3.3:	\$99.95
Dell Enhanced Microsoft MS-DOS 4.0:	\$119.95
(Both MS-DOS versions with disk cache and other utilities)	
Dell Enhanced MS® OS/2 Standard Edition 1.0:	\$324.95

TO ORDER, PLEASE CALL
800-426-5150
IN CANADA, CALL 800-387-5752

REVIEWS



dBASE users can breathe a sigh of relief—the long-awaited upgrade has finally arrived. Our review of dBASE IV begins on page 94.

94 **Is dBASE IV Worth the Wait?** *William Urschel*

dBASE IV surpasses the expectations of Ashton-Tate loyalists, but slowness and awkward SQL implementation deny it an unqualified thumbs-up.

100 **OS/2 Data Bases: First Steps** *Hal Chapel*

New OS/2 versions of *Paradox*, *R:base*, *Dataflex*, and *Informix-SQL* suggest that the OS/2 era has arrived. But are these new data managers worth the money?

108 **Hot Picks in Small Business Accounting**

Ralph Soucie and William Flora

Two CPAs cull eight popular accounting packages from the low end, with an eye to ease of use and essential features for small businesses.

122 **TOPS—The Low-End Link to Macs** *Robert Lauriston*

Wish your PC could hook up with the office Macintosh? A low-cost TOPS network makes this marriage work—just don't try to run multiuser applications.

126 **The Hardware Shelf** *Edited by Michael Goodwin*

- Is it a PS/2 or an AT? IBM's Model 30 286 is a little of both
- Arche's blazing 16-MHz Pro-File 286—faster than a 386?
- HP beefs up the LaserJet: duplex printing, more fonts, and a heftier price
- Intel and MultiTech offer two fine 2400-bps modems for the PS/2
- The Plus Passport is a fast, reliable hard disk that you can take with you

148 **The Software Shelf** *Edited by William Rodarmor*

- *PFS: First Graphics* excels at presentation-quality word charts, while *Graph-in-the-Box* transforms data into graphs in seconds
- *Turbo Pascal* acquires symbolic debugging and outshines its rivals
- Almost any program prints on a PostScript printer with *Trading Post*
- Bank, shop, and catch the news via *Prodigy's* inexpensive home videotex
- *Relay Gold 3.0* links PCs and mainframes and handles multiple sessions

NEWS

11 **Top of the News**

Mike Hogan

- Lotus opts for two-pronged 1-2-3 strategy
- *HyperPad* lets Everyuser customize data bases
- Micrografx unveils fluent graphics file translator
- HP ramps up its PC production

61 **Industry Outlook**

Edited by Eric Bender

- Novell milks *NetWare* success
- Solid Norton *Utilities* platform lets Norton diversify
- Wounded by VGA, Hercules sets its sights on monochrome

72 **Previews**

- Lotus's *Magellan* helps you navigate your hard disk, guiding you smoothly through searches

- Borland's *SideKick for Presentation Manager* is more than just a utility—it's a complete working environment

78 **Product Outlook**

Edited by Mike Hogan

- Older PCs can tap the power of a 386 host with SunRiver's multi-user system
- 651MB of storage on a 5¼-inch hard disk? Check out Storage Dimensions' subsystems for 286s
- OmniPage turns PC scanners into full-page recognition systems
- The Complete Communicator puts fax, voice mail, and modem on one phone line
- The multitasking Pentax Image Scanner boasts an automatic document feeder
- Two Princeton Graphics monitors offer high resolution for CAD and DTP

86 **Briefly Noted**

- Star Software's business planning package helps start-ups plot their future
- Eliminate tedious manual backups with the Instant Image 5500
- Novell's *NetWare* companion lets LAN users choose their own interface
- More *NetWare* enhancements improve gateways between a wide range of systems
- 1-2-3 add-ins *WSLink* and *Look & Link* transform monster worksheets into pussycats

90 **Update**

- IBM Token-Ring Network 16/4 Adapter, 16/4 Adapter/A, Token-Ring Network Bridge Program
- *Crosstalk XVI 3.7*, *Crosstalk Mk.4 1.1*
- *Mirror III*
- *Disk Technician Advanced*

FEATURES

164 **Checking Out Point-of-Sale Systems**

Ronnie Gunnerson

Retailers can track inventory and ring up sales with PC-based "counter intelligence" systems.

168 **Buyers' Guide: PC and XT Accelerator Boards**

Robert Luhn

80286 and 80386 accelerator boards can revitalize your PC or XT, boosting performance up to 500 percent. *PC World* presents more than 35 boards from 18 manufacturers.

HOW TO'S

172 **Laser-Sharp R:base Reports** *Karen Watterson*

Once you master these custom print options, you'll be able to print fancy *R:base* reports directly to your LaserJet.

176 **Tips & Techniques**

- How to Design a Data Base File, *Richard Scoville*
Structure your data base sensibly from the outset
- PageMaker Speedup Tips, *Matt Lake*
Built-in shortcuts make *PageMaker* step lively
- Track CompuServe Charges With Crosstalk Mk.4, *Ron White*
Write a CASL script to help watch your on-line budget
- User Group Tips
Scroll screen by screen in DOS, put the spurs to *WordPerfect*, and more



Four popular relational data base managers are now available in OS/2 versions that look suspiciously like their DOS counterparts, page 100.



Cast your vote for the best products around—and maybe win a \$50,000 dream system—in our 6th Annual World Class Awards Contest, page 35.

PERSPECTIVES

- 21 **Richard Landry**
Look under the hood of next-generation software, and you'll find a data base engine.
- 27 **Letters**
Don't get boxed in with Big Blue.
- 43 **David Bunnell**
Ashton-Tate's look-and-feel lawsuit will send a chilly wind through the industry.
- 49 **Stewart Alsop**
CD ROM innovations promise to open up new worlds for PC users.
- 276 **Another Angle**
Brian Livingston
Two standards are better than no standards at all.

DEPARTMENTS

- 6 **In This Issue**
A new column gives network managers an expert's helping hand.
- 189 **Consumer Watch**
Anita Amirrezvani
Getting a lot of interference at work? The culprit could be an improperly shielded PC.
- 199 **The Upgrade Path**
Robert Luhn
Why hasn't anyone made a go-anywhere hard disk that's as rugged and adaptable as a Hard-Card? Someone has.
- 205 **The Help Screen**
Karl Koessel
What works with DOS 4.0, how to automate a return address in letters, and more.
- 211 **Star-Dot-Star**
Edited by Tom Swan
A host of new developers' tools.
- 217 **Network Q&A**
David Ferris
PC World launches a column devoted to helping LAN users.
- 220 **PC World Catalog**
A convenient buying guide to PC products and services.
- 241 **Advertisers Index**
- 243 **Products Featured in Editorial**
More information for *PC World* readers.
- 248 **PC World Computer Products Shopping Guide**
A handy mail-order shopping guide.

John Griffin
President & Publisher

Richard Landry
Editor in Chief

Editorial

Managing Editor: Ed Bott
Senior Editors: Eric Knorr, Robert Luhn
News Editor: Mike Hogan (213/312-8041)
East Coast Editor: Eric Bender (617/574-9321)
Technical Editor: Karl Koessel
Senior Associate Editor: Anita Amirrezvani
Associate Editors: Eric Brown, Michael Goodwin
Production Editor: Cynthia Brown
Senior Copy Editor: Tema Goodwin
Editorial Production Mgr.: Ellyn L. Hament
Editorial Mgr.: Gina Vanlue
Assistant Editors: Rex Farrance (New Products), Wesley Nihei, William Rodarmor, Scott Spanbauer, Janet Walden (New Products)
Copy Editors: Barbara Lewis, Peggy Nauts, Dan Tynan, Sally Zahner
Lead Typesetter: Mark L. Duran
Typesetter: Barbara Tannenbaum
Editorial Assistant: Otto Waldorf
Administrative Assistants: Nancy Endy, Susan Lusty
Andrew Fluegelman Intern: Matt Lake
Contributing Editors: Stewart Alsop, Stephen A. Blumenthal, TJ Byers, Robert M. Carr, Steven Cook, Dennis Dykstra, David Ferris, Judy Getts, Michael Harper, Mark Henricks, Richard Jantz, Ted Nace, Richard Scoville, Ralph Soucie, Tom Swan
User Ombudsman: Dan Lavin (617/969-6555)
National Software Testing Laboratories (NSTL): Michael D. Stern (President), Lawrence D. Goldstein (Vice President, Operations), Jim Hurd (Vice President, R&D), Vicki Weiss (Vice President, Testing Services), Charles Vogt (Technical Editor), Greg Morgenweck (Technical Engineer), Mindy Klein (Communications Mgr.)

Art and Design

Art Director: Claudia Steenberg
Associate Art Director: Gregory Silva
Assistant Art Director: Robert Kaner
Senior Design Associates: Barbara Adamson, Emily Burch
Production Artists: Marlene Tobias, Hope Winslow

Production

Senior Production Mgr.: Linda Manes
Assistant Production Mgr.: MaryAnn DePietro
Advertising Billing & Booking Coordinator: Kevin Greene
Production Assistant: Katie Scott

Circulation

Circulation Director: Heather Martin
Single Copy Sales Director: George Clark
Single Copy Sales Rep.: Martin Garchar
Promotion Coordinator: Billie Brownell

Fulfillment Mgr.: Doug Norde
Circulation Assistants: Diane Richwine, Noël White

Research

Director: Cheryl Woodard
Research Mgr.: Ralph Ames
Research Analyst: Ray Petsche
Research Assistants: Bill Segovia, Scott Shores

Marketing

Director: JoEllen Bokar
Direct Marketing Mgr.: Ben Delaney
Marketing/Events Coordinator: Kim Kurata
Administrative Assistant: Sumie Ninomiya

Administration

Director of Finance: Vicki Peilen
Corporate Business Mgr.: Christina W. Spence
Accounting Mgr.: Pat Murphy
Admin. Services Mgr.: Joseph Wollenweber
Employee Relations Mgr.: Shelly Ginenthal
Technical Services Mgr.: Wally Clegg
Assistant to the President: Amy Marks

Corporate PCW Communications, Inc.

David Bunnell
Chairman

Lee Vidmer
President

James E. Martin
Vice President

Jacqueline Poitier
Vice President

Cheryl Woodard
Vice President

Andrew Fluegelman
1943-1985
Founding Editor

PC World™ (ISSN 0737-8939) is published monthly at \$29.90 for one year (12 issues), \$59.80 for two years (24 issues), \$89.70 for three years (36 issues) by PCW Communications, Inc., 501 Second St., San Francisco, CA 94107. Foreign orders must be prepaid in U.S. funds with additional postage. Add \$18 per year for Canada and Mexico; add \$25 per year for surface mail or \$110 per year for airmail for all other countries. Second-class postage paid at San Francisco and additional mailing offices. POSTMASTER: Send address changes to *PC World*, Subscription Dept., P.O. Box 55029, Boulder, CO 80323-5029. Editorial and business offices: 501 Second St., San Francisco, CA 94107, 415/243-0500; CompuServe 74055,412; The Source STE908; MCI Mail PCWORLD/179-3813. *PC World™* is an independent journal, not affiliated in any way with International Business Machines Corporation. IBM is a registered trademark of International Business Machines Corp. Copyright © 1989, PCW Communications, Inc. All rights reserved. The following are trademarks of PCW Communications, Inc.: PC World View, *,*, PC World. *PC World* is a publication of IDG Communications, the world's largest publisher of computer-related information. IDG Communications publishes over 100 computer publications in more than 34 major countries. Fourteen million people read one or more IDG Communications publications each month. IDG Communications publications contribute to the *IDG News Service* offering the latest on domestic and international computer news.

HOW TO CONTACT PC WORLD

Comments, criticism, suggestions, and complaints are always welcome. Send correspondence to *PC World*, Editorial Dept., 501 Second St., San Francisco, CA 94107. You can reach us electronically via MCI Mail PCWORLD/179-3813, CompuServe 74055,412, The Source STE908, or facsimile at 415/442-1891.

Subscription Services If you have subscriber service questions, call toll-free 800/525-0643 (303/447-9330 in Colorado) or write Subscriber Services, P.O. Box 55029, Boulder, CO 80322-5029. To place new orders call 800/642-9606.

Help With Your Computer or Software

Do you have any questions about the IBM PC or compatibles? Send them to *The Help Screen* at the address given above or electronically to MCI Mail Karl Koessel/336-4141. Do you have a business problem of general interest? Send your PC-related questions to the address given above, c/o Tips & Techniques. Questions with the broadest interest will be answered in the magazine. Sorry—we can't acknowledge individual letters or offer advice over the phone.

Product Information We're always interested in new products for our news and review sections. Send press releases and product announcements to Rex Farrance, assistant editor (software), or Janet Walden, assistant editor (hardware), at *PC World*, 501 Second St., San Francisco, CA 94107, or electronically to MCI Mail PCWORLD/179-3813, CompuServe 74055,412, or The Source STE908.

Editorial Calendars To receive a copy of *PC World's* Editorial Calendar, call your nearest regional *PC World* advertising sales and marketing office; a complete list of phone numbers appears opposite the "Advertisers Index."

Reprints and Permissions You must have our permission before reproducing any material from *PC World*. If you want to quote from or reprint any portion of an article or use artwork or photographs that have appeared in the magazine, send a written request to *PC World*, Reprints and Permissions, 501 Second St., San Francisco, CA 94107. Include your phone number if you need a fast response.

Writing for PC World *PC World* encourages reader submissions. For a copy of our writers' guidelines, send a self-addressed stamped envelope to the address given above. Manuscripts may be mailed, or sent electronically.

Letters. Letters should be mailed to the address given above, c/o *Letters*. All letters must include the writer's name, city, and state. They should not exceed one double-spaced typewritten page. We reserve the right to edit letters.

Star-Dot-Star. We pay \$25 to \$200 for each item published in *Star-Dot-Star*. Send your PC discoveries to the address given above, c/o *Star-Dot-Star*. All published submissions become the property of *PC World* and are subject to editing for length and style. Due to the volume of mail, we cannot acknowledge any submitted materials. Accepted contributions will be acknowledged by payment.

The Upgrade Path. Manufacturers offering hardware upgrade products, and readers with submissions or queries, should write to *The Upgrade Path* at the address given above.

Power Tips and User Group Tips. Have you discovered a timesaving technique for increasing PC productivity? Share it with other readers. Send your tips to the address given above, c/o Power Tips or User Group Tips. Keep submissions to 100 words or less; we'll pay \$25 for each tip published.

Consumer Watch. Think you've gotten a raw deal? Send the details to *Consumer Watch* at the address given above. We'll investigate your complaint; letters with the broadest interest will be published.



THE POWER FILE MANAGER DOES DATABASE WORK SO FAST, IT LEAVES THE OTHERS IN ITS WAKE.

If you want to cruise through database work at full speed, you need Q&A, the power file manager. Because Q&A's power makes database work easy. For example, by using Q&A's multi-file capabilities, you can pull an address from one database and pricing from another. And automatically include both in a separate

invoice database or report. Quite simply, Q&A is the easiest way to get even the toughest database work done. No wonder Q&A is the best selling file manager, and far and away the critics' choice.* Power file management with Q&A. It's the wave of the future.

CALL FOR A FREE DEMO DISK (800) 228-4122 EXT. 450W

The #1 Rated And #1 Selling File Manager

POWER FILE MANAGEMENT

- Single command multi-file lookup for automatically filling out forms and creating reports
- Two-keystroke mail merge, and built-in support for all popular mailing labels
- True local area network support with record locking for sharing databases, password protection, and automatic screen update
- Powerful programming commands



*Editor's
Choice*



SYMANTEC™ Symantec Corporation, 10201 Torre Avenue, Cupertino, CA 95014. 408/253-9600.
OS/2 VERSION NOW AVAILABLE. See package for details. * #1 best-selling File Manager according to a recent survey of National Distributors. Q&A received PC World's Best Buy 7/88 and World Class 9/88; Software Digest #1 File Manager 2/88; InfoWorld 9.3 rating 5/88; PC Magazine Editor's Choice '87 and '88. Q&A is a trademark of Symantec Corporation. © 1988 Symantec Corporation

Circle 108 on reader service card

Zen and the Art of Network Maintenance



Associate Editor
Eric Brown and
Contributing Edi-
tor David Ferris

Local area networks complicate life, overwhelming even experienced managers with intricate maintenance requirements. When LANs are involved, expert assistance is not only welcome, it's virtually essential. That's the spirit behind a *PC World* department that debuts this month.

In *Network Q&A*, Contributing Editor David Ferris will deal with the practical concerns of network managers. The amiable British native, who holds degrees in mathematics and philosophy, commands impressive fees for his lectures on corporate PC networking. His San Francisco-based firm, Ferris Network Integration, provides network configuration, maintenance, and training services for clients of all sizes.

Despite those high-powered credentials, Ferris hasn't forgotten the needs of down-to-earth PC managers. Most businesses, he argues, can't afford to develop in-house network expertise, and retail PC channels don't offer the added value that LAN buyers need.

In terms of day-to-day PC support, Ferris says his firm's customers "already have strong in-house technical skills. Ideally, we can take charge of the specialized network issues, freeing up the in-house support staff to deal effectively with the concerns of the

end users and the specific needs of the business."

PC World readers can expect the same relationship with *Network Q&A*. Associate Editor Eric Brown, who edits the column, says that the key to its success will be translating Ferris's considerable expertise into terms users can understand. "Like most *PC World* readers," Brown explains, "I've got plenty of experience with PCs and almost none with networks. It's the editor's job to select questions that will appeal to a wide cross section of readers, and to keep the answers focused on the needs of managers."

We're confident that *Network Q&A* will become a primary source of information for anyone dealing with LANs.

Also in this issue: You've got data base questions, we've got answers. Should you switch to an OS/2 version of your favorite relational data manager? Don't decide until you've read "OS/2 Data Bases: First Steps." Is *dBASE IV* worth the wait? Read William Urschel's in-depth review to find out. And have you ever wondered how to build a data base from scratch? Richard Scoville ("How to Design a Data Base") offers some valuable tips and techniques. We also feature a look at point-of-sale systems, a roundup of affordable accounting packages, a buyers' guide to PC and XT accelerator boards, and previews of Lotus's *Magellan* and Borland's *SideKick for Presentation Manager*. ●

Ed Bott

Ed Bott
Managing Editor



Finally, a PC network that's fast and friendly.

A lot of people choose the TOPS/DOS network for its raw Ethernet® speed. Some for its friendly menu-driven interface. And some buy TOPS for the best reason of all... it's both fast *and* friendly.

TOPS Tech Specs.

- Requires one of following—3COM EtherLink II, 3COM EtherLink MC, TOPS FlashCard, or SynOptics LattisNet—to run on any IBM PC, PS/2 or compatible.
- Compatible with many DOS 3.1 or NETBIOS-compatible LAN applications, such as dBASE III LAN, WordPerfect 5.0 LAN, Microsoft Word Network, and Q&A 3.0 Network.
- All TOPS network functions can be accessed from the DOS command line.
- Can be configured in Client-only (120K) or Client/Server (190K) modes.

As with all TOPS local area networks, TOPS/DOS requires virtually no training. With just a few simple menu selections you can quickly access other PCs, exchange files, and share peripherals as if they were your own. To install one yourself, just plug in a network card, your TOPS software (only 2 disks), and some very basic network cabling. No central server is needed, but you can easily add one as your needs grow.

TOPS/DOS makes fast, friendly connections to other systems, too. You'll find the TOPS name on a complete family of network solutions that allow you to expand your

PC network to include Macintoshes™, Sun® workstations, and even other networks.

Make some fast and friendly connections of your own. Call the TOPS division of Sun Microsystems at 800-445-TOPS (from outside the U.S. and Canada, call 415-769-8700). Or write to us at TOPS, Dept. #103, 950 Marina Village Parkway, Alameda, CA 94501.

TOPS®

When you need connections.





Step 286/12	2.45 MIPS
Step 286/16	3.27 MIPS
Step 386/16	3.93 MIPS
Step 286/20	4.24 MIPS
Step 386/20	4.91 MIPS
Step 386/25	6.13 MIPS

Source: Power Meter MIPS Version 1.3. The Database Group, Inc.



"I used to be afraid of monsters. Now I can't get along without them."

Janet Johnson, President
Coordinated Digital Systems
Dayton, Ohio



"I'll be right over."

The most incredible collection of people find their way to my door. Students. Aerospace engineers. Genealogists.

They come because they hear we do more than sell computers out of a box. We try to make everything very personal.

We know our products backwards and forwards because we use them ourselves. We write custom software.

We're writing a lot of business.

We work almost exclusively with one computer company. Everex.

Because every one of their six computers is at the head of its class.

And because they take care of me the way I like to take care of my customers.

Find out more about Everex Step computers. Call 1-800-356-4283. Everex Computer Systems Division, 48431 Milmont Drive, Fremont, CA 94538.

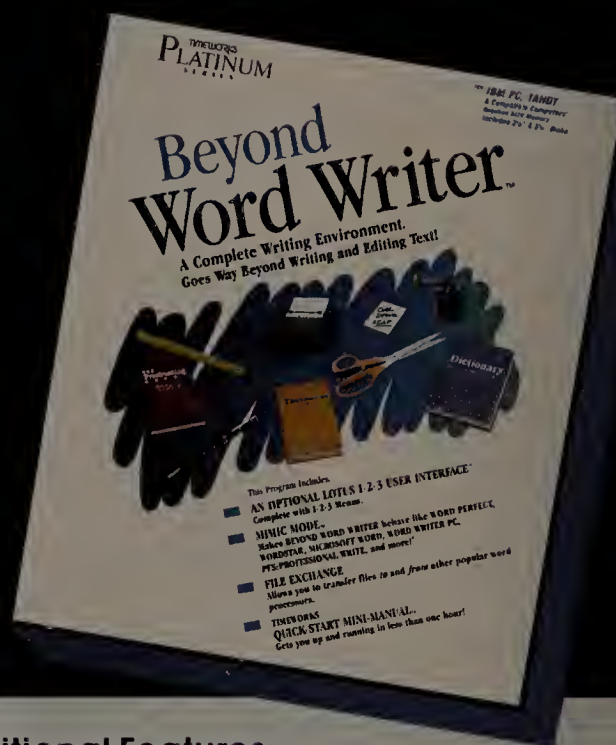


Circle 244 on reader service card

Nobody in this world needs another word processor.

So enter a world beyond that.

Beyond Word Writer... A Complete Writing Environment. Goes way beyond writing and editing text.



At a Glance:

BEYOND WORD WRITER is not your typical word processor. It places you in a highly intuitive writing environment which takes you far beyond simply writing, editing and printing documents.

This includes:

- **An Optional Lotus 1-2-3 Interface, complete with 1-2-3 menus.**
- **A Mimic Mode**—Makes this program behave like most other popular word processors. No need to learn new commands.
- **A Transparent User Interface** that gives you clear passage from function to function, making BEYOND WORD WRITER an extremely fast and highly efficient program to use.
- **A File Exchange Feature** that allows you to easily transfer files to and from other popular word processors.
- **Unique Time-Saving Features** such as 3-Way OOPS! Control; multiple document windows; and built-in Macros.
- **Writing Shortcuts** that match your "speed of write" to your "speed of thought".
- **Multiple Document Windows** that let you work on several documents simultaneously—even while you're printing out!

Plus, simply press the key and you have 3 Spell Checkers (with a 100,000-word dictionary); a 240,000 synonym Thesaurus; an on-screen Outliner; a Proofreader; and so much more.

By using BEYOND WORD WRITER's advanced formatting features—for example, proportional spacing, and as many font styles as your printer supports—your documents become polished and professional.

No Word Processing or Computer Experience Necessary

For all its technical brilliance, BEYOND WORD WRITER is refreshingly easy to use. No prior experience is really necessary. Its transparent User Interface, Special Time-Saving Features, and the Quick-Start Mini-Manual all combine to get both the novice and power computer user up and running in less than one hour!

Additional Features:

- **A Readability (Fog) Index**—Shows the educational level required to understand your writing.
- **Sorting**—in ascending or descending alphabetical order.
- **User-Defined Abbreviations**—Reduces long names and phrases to 2 keystrokes.
- **Background Printing**—Prints while you work.
- **Bookmarks**—Tells you where you left off.
- **Automatic Timed Back-up**—Safeguards against lost data.
- **Advanced File Management**
- **Title Pages**
- **On-Screen Multiple Columns**
- **Line and Box Drawing**
- **Document Linking**
- **Automatic Index Generation**
- **Automatic Table-of-Contents Generation**
- **Widow & Orphan Control**
- **WYSIWYG Display**
- **Automatic Footnote Numbering**
- **Automatic Page Numbering**
- **International Characters**
- **Ruler Bars**
- **Column Addition**
- **Automatic Date Entry**
- **Cut, Copy & Paste**
- **Password Protection**
- **Prints Multiple Copies**
- **Book Printout with Special Margins**
- **Variable Line Spacing**
- **Soft & Hard Hyphenation**
- **User-Defined Page Breaks**
- **Integrated Mouse Support**
- **On-Screen Centering**
- **On-Screen Right Justification**
- **Decimal Tabs**
- **Context Sensitive Help Screens**
- **File Unerase**
- **And much, much more**

Suggested Retail Price... **\$199.95** Includes 5¼" & 3½" disks.

Ask your Dealer for a demonstration today—
or order direct from Timeworks: 1-312-948-9202.



444 Lake Cook Rd.,
Deerfield, IL. 60015-4919,
312-948-9200

©1988 Timeworks, Inc. All Rights Reserved.

Circle 151 on reader service card

With Timeworks You Get:
• Free Customer Technical Support
• A Money Back Guarantee

TOP OF THE NEWS

Release 2.x to Endure

*Lotus Will
Continue to
Enhance Most
Popular PC
Program*

Contrary to the widespread expectation that 1-2-3 release 3.0 will replace the current release 2.01, Lotus Development Corporation has settled on a two-pronged strategy for keeping 1-2-3 the most popular PC package on the market. Although Lotus refuses to give details, it is expected to introduce an upgrade to release 2.01 this spring, probably before a June debut of release 3.0. "Release 3.0 will be our flagship product for those within work groups needing powerful consolidation," says a Lotus spokesperson. She acknowledges, however, that "there is a segment that needs a product like release 2.x." Recent statements made by Frank Ingari, general manager of Lotus's spreadsheet divi-

sion, imply that the 2.x line will be aimed at users with PCs, XTs, and low-end ATs who create only moderate-size worksheets and don't need 3.0's enhanced graphics and ability to open, link, and consolidate multiple worksheets. Many other 3.0 features are already available in release 2.01. In recent months, Lotus has given registered users utilities to remove copy protection, record macros, perform minimal recalcs, and drive PostScript printers and VGA displays. Additionally, Lotus has instituted a dealer promotion offering Funk Software's *Always* graphic/font enhancement with new sales of release 2.x. All 2.01 enhancements are logical candidates for inclusion in any new 1-2-3 release.

HyperCard-Like Package Comes to the PC

*Low-Cost Tool
Makes Pro-
grammers of
the Rest of Us*

Brightbill-Roberts in Syracuse, New York, introduced an IBM-compatible equivalent of Apple Computer's *HyperCard* in late February. A \$99 program comparable to that shipped with every Macintosh since August 1987, *HyperPad* lets users create hypertext data bases, or pads. These are composed of "stacks" of forms whose fields can be linked with similar or dissimilar fields among the same or different pads. For instance, a name field can be linked by a "button" to any of the fields in a series of invoices, thus revealing a history of customer purchases. Hypertext proponents suggest that this nonrelational linking more closely mirrors the way humans think than do other data base schemes. *HyperPad* is intended for nonprogram-

mers who want data bases customized to their way of working or for creating training applications in which users can wander from topic to topic at will. *HyperPad*'s object-oriented form painter can be used to cut and paste a screen's worth of fields. That code is written automatically but can be modified for reuse with an English-like scripting editor. *HyperPad* has lower memory and processor requirements than either *HyperCard* or upcoming Windows-based competitors, maintains principal Steve Brightbill, because its user interface employs character-based rather than bit-mapped graphics. "You can have hundreds of forms in memory at any time, whereas you can have only a couple of cards in memory on a Mac," he maintains.

Translator Developed

*Micrografx
Introduces
Graphics File
"Rosetta
Stone"*

Any day now, Micrografx will introduce a graphics utility to convert graphics files back and forth between various object-oriented and bit-mapped formats. Micrografx president George Grayson describes the product, code-named *Passport*, as "a kind of graphics Rosetta stone" similar in operation to several utilities that translate word processing file formats. Initially, *Passport* will transfer between CGM, Macintosh Pict1 and Pict2, AutoCAD .DXF, and Micrografx's own .DRW formats. Within six months, the Richardson, Texas, firm hopes to add the *GEM Draw* format from Digital Research and Adobe's PostScript EPS format. "We are going slow because we want to offer as true a translation as possible," says Grayson. "We support CGM the way that *Harvard Graphics* does

and the way that *Freelance* does and the way that the ANSI committee specifies." Grayson expects *Passport* to retail for \$295 to \$395. The utility also will be offered in version 2.0 of Micrografx's *Designer*, due to ship in March. That version will read object-oriented code and write bit-mapped color TIFF images—a capability scheduled for a future *Passport*. Eventually, Micrografx hopes to propose a wider-reaching graphics interchange/editing specification to the Windows Presentation Manager Association. Users of *Windows* and Presentation Manager applications that included the Integrated Document Environment Architecture specification then could "click on" a graphic, and the appropriate graphics editor would pop up.

HP Is Back

*Mini Maker
Resurrects Its
Retail PC
Business*

Although Hewlett-Packard is one of the world's largest computer companies, its name has not exactly struck fear into the hearts of other PC makers. But during the past year, HP has begun to leverage the success of its market-leading LaserJet, ThinkJet, and plotter lines to help PC sales. This struggle began in 1985 when HP began to put together a complete line of Vectra desktops and laptops and convince more of the 2500 dealers who carry its peripherals to take on Vectras. During the past year, HP has more than doubled its number of authorized PC dealers—to 650—and tripled revenues from PCs sold through them. With direct

and system manufacturer sales, HP's overall PC revenues grew 45 percent in 1988, while its unit sales more than doubled. "If you add up the dollars from sales of both our PCs and peripherals through U.S. dealers, we are the number three supplier behind IBM and Apple," asserts Bob Puett, general manager of HP's PC Group. His group claims 5 percent of the worldwide PC business and sets new sales records every month. HP plans to continue to shift its focus away from its mini client base and toward retail. At the end of January, HP announced new 20-MHz and 25-MHz cached 80386 systems and an 80286-based laptop.

OS/2 WordPerfect Ships

*Word Proces-
sor Advances
Toward
Presentation
Manager*

The first OS/2 version of a market-leading, major application will appear this month, as WordPerfect Corporation delivers *WordPerfect 5.0 for OS/2 1.0*. Product Manager Chuck Middleton describes the word processing package as an "intermediate step" toward a Presentation Manager version, due out by year-end. *WordPerfect 5.0 for OS/2 1.0* costs \$549, compared with \$495 for the DOS version; its main advantage is the ability to open more than two document files simultaneously. The company plans to let users upgrade to the PM version for about the price difference between DOS and OS/2 1.0 versions, reports Middleton. The PM release will

abandon the familiar function-key-controlled design in favor of a graphic user interface much like *WordPerfect for the Macintosh*. While the new release will generally have the same functionality as the DOS program, an edit mode will reveal documents just as they will be printed, complete with font styles, graphs, and special treatments such as underlines. Also added will be support for a mouse and Dynamic Document Exchange, so that a data base table or spreadsheet range brought into a document will maintain its "live" links with the file from which it was imported.

DeskMate Gains First Publisher

*Software
Publishing
Introduces
First Business
Best-Seller for
Tandy's
Interface*

Software Publishing's *First Publisher 2.0* has become the first major business product to ship under Tandy Corporation's *DeskMate*, approximately eight months after Tandy announced plans to license the user interface/desktop utility. *First Publisher* product manager Jill Groginsky attributes the long lead time to the difficulty of creating a memory management scheme so that both the character-based graphic user shell and the 430K application can fit within 640K. Symantec also has signed on to the specification but doesn't expect to deliver before June. Except for the addition of VGA color support, *DeskMate* compatibility is the principal enhancement in this version of *First Pub-*

lisher, which has sold an estimated 200,000 copies since its 1987 introduction. Groginsky says the development will be worth the trouble if it lets the Mountain View, California, company reach the estimated 300,000 Tandy computer customers who use *DeskMate* regularly (out of 1 million who own it). The program also is showcased in Tandy's 1 million product catalogs and on the shelves of its 600 Computer and Computer Plus stores, and can be ordered through the remaining 6400 or so Radio Shacks. Groginsky expects the first order from Tandy to cover development costs. If *First Publisher* is successful under *DeskMate*, other products such as *Professional Write* could follow.

We turn PC owners into PC users. For only \$6.65 a month.



A subscription to Big Blue Disk brings you two 5 $\frac{1}{4}$ " disks*, chock-full of great programs for your IBM® PC or compatible, each month for just \$6.65.

Learn all the capabilities of your PC.

Big Blue Disk takes you beyond the two or three programs you bought for your PC. Without spending a fortune, Big Blue Disk will introduce you to new software *you can use* each month. You will get telecommunications, DOS shells, accounting applications, graphics, educational programs, and specialized utilities that make your PC easier to work with. There are even some terrific games as a bonus.

Big Blue Disk programs are *original software*, not public domain, so you will build a quality software collection as you learn. Each month you will sharpen your computing skills and become a smarter software buyer. You just can't buy better computing experience.

Contents of Issue #24 (Available as a back issue)

Small Business Accounting System—A ledger for small businesses.

Mandelbrot Microscope—See the world of fractals in graphic detail.

Calorie Calculator—Plan menus and keep track of your calorie intake.

Plus 3 more great programs!



FREE SOFTWARE with your order.

Try Big Blue Disk for six months for only \$39.95. As a bonus, we will send you FREE—the *Best of Big Blue Disk* which contains the very best programs from past issues.

Money-back guarantee.

If you are not satisfied with your purchase for any reason, return your first issue for a full refund. The *Best of Big Blue Disk* is yours to keep. You can't lose, so order today!

Call toll free 1-800-831-2694.

*Also available on a single 3 $\frac{1}{2}$ " disk.
IBM is a trademark of International Business Machines.

Circle 66 on reader service card

YES! Please rush me my free *Best of Big Blue Disk* and start my six-month subscription to Big Blue Disk for my IBM PC or compatible for only \$39.95 postage paid. (Canada/Mexico \$49.95, Overseas \$59.95) Make checks payable to Softdisk, Inc. in U.S. funds. (Louisiana residents add 4% sales tax).

☐ Two 5 $\frac{1}{4}$ " disks ☐ One 3 $\frac{1}{2}$ " disk

Name

Address

City State Zip + 4 -

Home Phone () -

☐ Discover ☐ AmEx ☐ VISA/MC ☐ Payment Enclosed (U.S. funds only!)

Card # Exp.

Signature

SOFTDISK, INC. P.O. Box 30008 • Shreveport, La. 71130-0008 PW039

MicroPro Refocuses

Pioneer Reorganizes, Gains New President, and Re-thinks Product Line

After three years of sluggish sales for its flagship, *WordStar*, and the largest operating loss in its history, MicroPro International has replaced President Leon Williams with Chief Operating Officer Gari Grimm, downsized the company, and redirected its marketing activities. Partly due to delay in releasing *WordStar 5.0*, MicroPro lost \$5.1 million on virtually flat revenues of \$42.3 million in fiscal 1988 and lost \$2.6 million on revenues of \$9.7 million in the first quarter ended November 30. In an effort to cut \$3 million in operating costs, Marc Bailey, executive vice president of sales and marketing, combined existing departments and cut staff by about one-fifth. But he more than doubled the number of direct salespeople to 30 and

launched channel promotions that gained the company 650 new dealers during the last quarter of 1988. (Only 15 percent of dealers had been selling *WordStar*.) Bailey has refocused marketing to emphasize what he calls "the genius of *WordStar*"—touch typists don't have to move their fingers off the "home keys" in order to navigate a file or use the most common editing functions. Rather than compete with *WordPerfect* and *Microsoft Word* on number of features, MicroPro will emphasize that *WordStar* offers users the most popular feature set running efficiently on the smallest platform. More than 3 million copies of *WordStar* have been sold, with 360,000 registered users. A mostly technical revision, *WordStar 5.5*, was released in February.

OS/2 Enhancements Coming

IBM, Microsoft Draw Blueprint for Operating System

A rebuilt file system, an 80386 version, and a move into object-oriented programming are among OS/2 plans outlined recently by IBM and Microsoft executives. Although a release date has not been specified, the upgraded file system will offer faster access, greater usability (including longer file names and the ability to attach other attributes such as author name and revision date), and standardized hooks to a broader range of media (such as CD ROM). A tool kit is expected around mid-year for the 80386 version, which will run existing OS/2 packages but will also add 32-bit linear addressing and the ability to run multiple DOS sessions. While OS/2 1.1's Presentation Manager provides a foundation for object-oriented programming, the system software eventually will be

extended to accommodate more complete object-oriented attributes à la Hewlett-Packard's *New-Wave* environment. Developers will be able to create libraries of reusable objects that combine data and code—boxes, scroll bars, or even applications such as data bases—and can be easily linked together or moved across different hardware platforms. Currently, OS/2 has attracted 200 developers, plus 55 system manufacturers, most of which expect to begin shipping their versions of OS/2 1.1 this month. OS/2 acceptance has been slowed by a dearth of applications, the need for hardware suppliers to create printer and screen drivers, and revelations that typical memory requirements will start at around 4MB, comments Compaq vice president of sales and marketing Mike Swavely.

SPI Ships Miris

Integrated Software Developer Prefers Ease of Use to dBASE Standard

Software Products International (SPI), maker of the *Open Access II* integrated package, has unveiled a relational data base development system that lets even novice users customize the reports of executable run-time applications. *Miris* ships as a \$795 developers' edition that produces economical code, claims Ron Stevenson, director of product applications. The software also includes a compiler and an unlimited run-time license so that commercial and in-house developers can distribute applications to users who lack a copy of the development system. A \$395 user tool kit, *Stations*, allows

users to customize *Miris* report formats or develop new reports simply by painting them on the screen. *Miris* also includes a word processor, a spreadsheet, and telecommunications and graphics modules. These, Stevenson says, are more capable than similar modules in *Open Access II*. The San Diego firm has sold about 100,000 copies of this high-end integrated package, most of them overseas. *Miris* will be marketed to corporate and commercial developers in the United States, although it will not read native *dBASE* files, and other applications can't read its SQL. ●



If You Could Have It All.... Would You Take It ???

If you could have all the power your network fileserver needs and more, along with the reliability and stability you demand, would that be good? If you could get all that AND on-site service for emergency repairs, would that be great? And if you can get all that computer with all that quality and service for a great price, would that be perfect? If that is WHAT YOU WANT, what are you waiting for? CALL US NOW!

Model 9841-386 File Server **\$5796**

80386-25 CPU, 6/25 MHz clock speed, zero wait state, w/2MB 32-bit RAM, maximum 8MB on motherboard, two serial & one parallel ports, Phoenix BIOS, 1.2MB floppy drive, ESDI HD/FD controller, 150MB ESDI hard disk drive, monographics card, 101 keyboard, amber monitor.

Same system w/4MB & 330MB ESDI hard disk **\$7838**

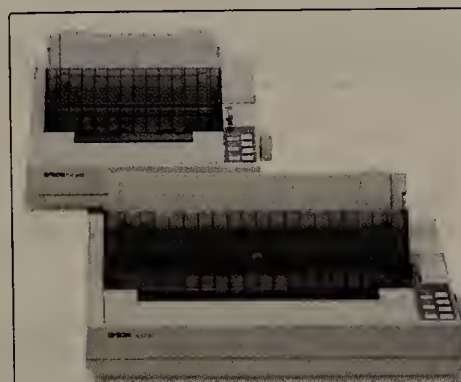
Free compsurf certification service. Free network installation if purchased with system. Call in for prices.

Model 4682 **\$2995**

80386SX-16 CPU, 8/16 clock speed, zero wait state, w/1MB RAM, maximum 2MB on motherboard, AMI BIOS, 1.2MB floppy drive, 1:1 interleave HD/FD controller, 40MB hard disk drive (25ns access time), VGA adapter card, one serial & one parallel port, 101 keyboard, multiscan monitor (820 x 620 resolution).

All systems included one year nation wide on-site service.

All prices are subject to change without notice. Microsoft Windows, Phoenix, ESDI, and Epson are the trademarks or registered trademarks of their respective companies. ELT4 v11/16/89



**FX-850 &
FX-1050**

Epson is a registered trademark of Seiko Epson Corporation. SmartPark is a trademark of Epson America, Inc.

Epson's FX printers are legendary in the computer products industry. The FX-850 and FX-1050 continue Epson's long tradition of quality, performance and reliability. Now with increased speed and advanced features, the legend grows stronger.

Paper-Handling Performance. The narrow-carriage FX-850 and wide-carriage FX-1050 are equipped with SmartPark™, a unique Epson innovation that lets you switch from fanfold paper to single sheets or envelopes without removing hardware or paper.

Built-In Convenience. Epson's SelectType front control panel puts popular printer features and SmartPark operations at your fingertips.

High-Speed Productivity. Both print 264 characters per second (CPS) in draft mode and 54 CPS in Near Letter Quality mode—insulated for quiet operation.

Backed by the Leader. Like all Epson computer products, the FX-850 & FX-1050 printers are supported by a nationwide service network and backed by Epson's one year limited warranty.

EPSON®

**WHEN YOU'VE GOT AN EPSON,
YOU'VE GOT A LOT OF COMPANY™**



ELTECH RESEARCH INC.

1725 McCandless Drive, Milpitas, CA 95035

Sales: (408) 942-0990

Technical Support: (408) 942-1067

Canadian Customers please call our Canadian Distributor TOPOWER at (604) 275-1119

Circle 111 on reader service card

We make a super VGA monitor



NEC introduces the best VGA monitor you can
buy. MultiSync® 2A.

The first monitor that takes our award-win-
ning multiple frequency technology and cus-

tomizes it to the needs of the VGA user.

MultiSync 2A is both affordable and uncompromised. And
completely compatible with all VGA modes. In short, it performs
brilliantly. But what's equally important, it allows you to move
effortlessly to the next major graphics standard: SuperVGA.

All this in a monitor that gives you a 14" non-glare screen on
a tilt-swivel base, for nearly 30% more viewing area than stan-
dard 12" screens, and a new cabinet that's not only functional but is
designed to look as good from the back as it does from the front.

MultiSync 2A. One super VGA monitor.

VGA mode shown at 320 X 200



Computers and Communications

that's also a SuperVGA monitor.



But that's only part of the story. NEC also introduces the best SuperVGA monitor you can buy. MultiSync[®] 2A.

The first monitor that takes our award-winning multiple frequency technology and customizes it to the needs of the SuperVGA user. MultiSync 2A senses the software you're using and makes the switch from a VGA monitor to SuperVGA, the new standard developed by NEC and recognized by VESA, the Video Electronics Standards Association. SuperVGA delivers a maximum resolution of 800 x 600, which is 56% higher than VGA.

And since you're most likely buying a board that goes beyond VGA, your monitor should too. For literature call 1-800-826-2255. For technical details call NEC Home Electronics (USA) Inc. at 1-800-FONE-NEC.

MultiSync is a registered trademark of NEC Home Electronics (USA) Inc.

MultiSync 2A. One SuperVGA monitor.

© 1989 NEC Home Electronics (USA) Inc.

NEC

Circle 312 on reader service card

Some views on why the NEC MultiSync

There's a lot more to the new MultiSync® 3D monitor from NEC than meets the eye. Because instead of making one monitor for each

graphics board, we've developed a monitor that enhances



the performance of the modes on practically any board.



With its new microprocessor-controlled digital tuning system, MultiSync 3D can adjust to a given video standard with a precision matched only by a few high-end single-frequency monitors.

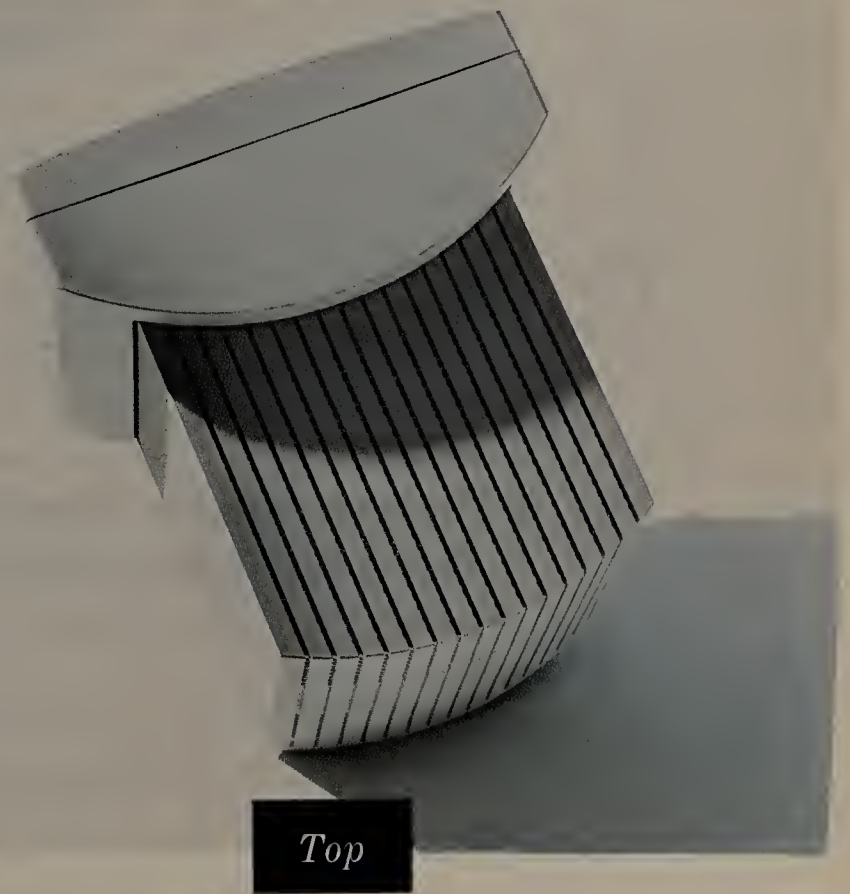
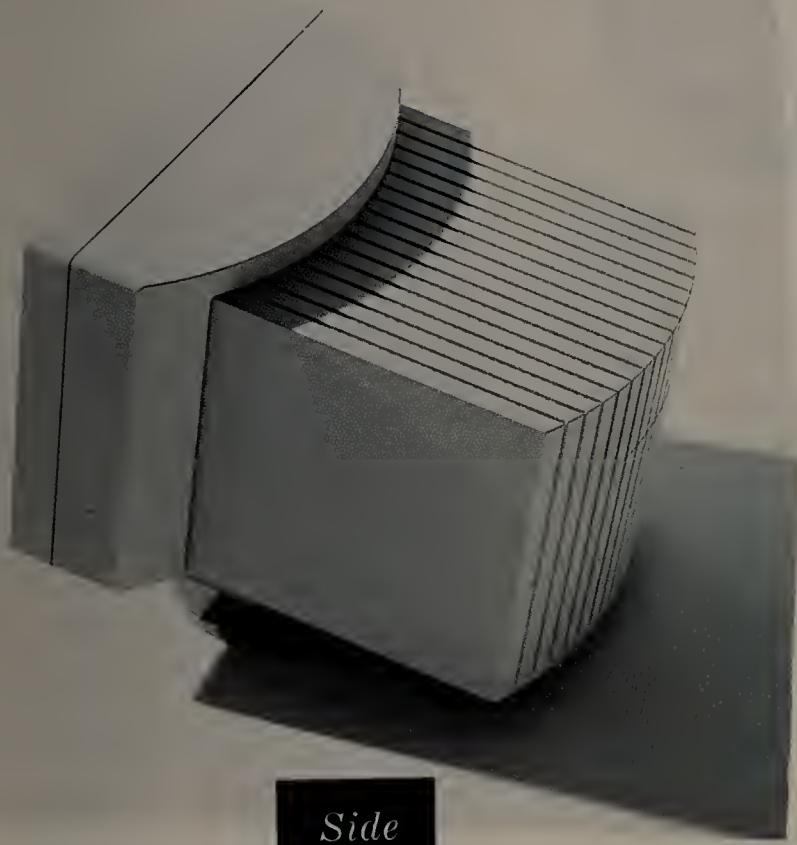
Making it perfectly compatible with virtually all systems and boards. From 8514A, SuperVGA and Mac II to VGA, EGA, MDA and

3D is the new monitor standard.

CGA. For an incredible maximum resolution of 1024 x 768.

What's more, MultiSync 3D is equally compatible with you and your workplace. There are upfront controls, for easier access. A 14" non-glare screen on a tilt-swivel base, for more comfortable viewing. And, as you can see, there's even a full 360 degree design.

The way we see it, MultiSync 3D



has dramatically raised the

standards by which all other color monitors will be judged.

MultiSync is a registered trademark of NEC Home Electronics (USA) Inc.

For literature, call 1-800-826-2255. For technical details call NEC

Mec II is a registered trademark of Apple Computer, Inc.

Home Electronics (USA) Inc. 1-800-FONE-NEC.

©1989 NEC Home Electronics (USA) Inc.

NEC

Circle 171 on reader service card

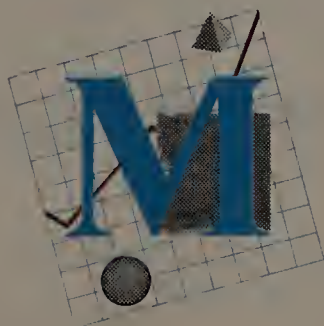
50,000 illustrators agree,
Micrografx Designer
is the graphics software
of choice.



They're in good company.

**PC Magazine's Technical Excellence Award:
Best Graphic Software of the Year, 1988**

Whether you're into desktop publishing, graphic design, presentation graphics, or technical illustration, Micrografx Designer is the illustration software package for you. See what you've been missing. For a free self-running demo, call 800/272-3729.



MICROGRAFX

1303 Arapaho • Richardson, TX 75081 • 214/234-1769 • 800/272-3729
Surrey House • 34 Eden Street • Kingston • KT1 1ER • UK • 01-547 1638

The Data in Everything

From word processors to file managers to E-mail
to desktop utilities,

data base software is showing up in some
strange places.



**Richard
Landry**

When you think data base software, you think *dBASE*—right? Think again. One of the most interesting software packages of 1989 is a data base, but it doesn't advertise itself as such. In fact, it doesn't even claim to be a full-blown application. Instead, Borland's *SideKick for Presentation Manager* is a great example of how data base concepts will add zip to the next generation's software (see Eric Knorr and Karl Koessel's *Preview* in this issue).

Borland built *SideKick for PM* around the novel idea that the user, not the application, owns the information he or she creates. In other words, you should be able to use *SideKick* Phonebook entries in a direct mail campaign that you run with Borland's full-blown data base, *Paradox*, or analyze costs in *Paradox* with data pulled from a *SideKick* schedule. That's not exactly a radical idea, but it's rare enough in practice. *SideKick for PM* turns this notion into reality by managing data with a *Paradox* kernel and saving it in *Paradox* file format. The item that you store in *SideKick* today will be available to you in *Paradox* tomorrow—and vice versa.

Although Borland's leading the pack into a "data-based" future, others are not far behind. Take a look at Microsoft's *Word*

5.0, Lotus's *Magellan* (see Eric Bender's *Preview* in this issue), Traveling Software's *ViewLink*, and Oracle's recently announced E-mail package, *Oracle*Mail*. Each of them treats the information on your hard disk as data that should be available to you quickly and easily. All of them have a data base manager growling beneath the hood. And that's just the start. Virtually every application you now use will soon have a data base manager at its core.

How far can this concept go? Ask *dBASE* creator Wayne Ratliff. With his *Emerald Bay* project, Ratliff envisioned a family of applications that snapped on to the same underlying data base core and shared information with it. Ashton-Tate has its own version of that idea, promising a future suite of *Presentation Manager* applications with hooks into its data base server. Somewhat sooner than that, Lotus will embed SQL data base hooks into 1-2-3 release 3.0 and its upcoming graphic spreadsheet, 1-2-3/G.

Such innovation brings its own troubles, of course. Vendors will be sorely tempted to create data-based solutions that work well only within their own product line. In this way they'll try to enforce customer loyalty to their
(continues)

Spin your favorites with push-button ease.

DIRECT ACCESS. The leading menu system for hard disk management.

DIRECT ACCESS is to your software what a jukebox is to records. Both are fun and easy to use. Simply choose a title from an organized listing, push a button and play your selection.

**PC
MAGAZINE**

**EDITOR'S
CHOICE**

DIRECT ACCESS lets you hop over complicated DOS commands, reduces errors, provides complete usage tracking, and secures your data with password protection.



© 1988 Delta Technology International. DIRECT ACCESS and DIRECT NET are trademarks of Delta Technology International.

DIRECT ACCESS tops all the national best seller charts—it's the ultimate menu system for hard disk management. There's no easier, faster or more organized way to play your software.

Also available, **DIRECT NET**, the single keystroke network menu system.



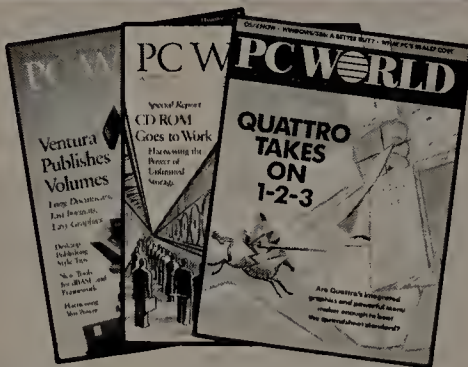
Call for the name of the dealer nearest you.

1-800-242-6368

1621 Westgate Road, Eau Claire, WI 54703, (715) 832-7575, FAX (715) 832-0700

Circle 176 on reader service card

BACK ISSUES



Missing something? Back issues are available for \$6 per copy (U.S. and Canada), while supplies last. Rate includes surface delivery. If you wish airmail delivery, please add \$6 per copy (U.S. and Canada). For all other countries, back issues are \$20 per copy, which includes airmail delivery. For foreign orders, prepayment is required in U.S. dollars.

Simply enclose payment, specify the issues and quantity you desire and send to:

PC WORLD

Back Issue Department, 144 Townsend Street, San Francisco, CA 94107
Sorry, phone or credit card orders cannot be accepted.

brand name and squeeze out the competition. Fortunately, that strategy has never been too successful—how many 1-2-3 users also use *Manuscript*? How many *WordPerfect* users also use *Plan-Perfect*? And admirable as *Side-Kick for PM* is, how many of its users will also use *Paradox*?

More important, data-based application software will raise a host of management issues you might never have considered before. Your choice of word processor, spreadsheet, or communications package, for example, will depend partly on how well the product fits into your company's data base scheme. And it will give new urgency to a question that gets more troubling each passing day: If I dump this software, can I take my data with me?

As always, I'm interested in your opinions on this or any other subject. Write to me at *PC World*, 501 Second St., San Francisco, CA 94107; fax 415/442-1891; MCI Mail Richard Landry/301-3685. ●

POWER TIP NO. 37

Scroll by Screen With WordPerfect

Since a *WordPerfect* page contains up to 54 lines of text, pressing <Page Down> or <Page Up> to search through a document will sometimes cause you to skip a full screen of text. Instead, use <Gray Plus> and <Gray Minus> to move 24 lines at a time.

Bruno Terkaly
Corte Madera, California

To learn Microsoft QuickBASIC, you only need a manual this thick.



You're looking at something you won't see anywhere else.

It's called QB Advisor. A remarkable new hypertext electronic manual that can make you instantly more productive, even if you don't know the first thing about programming. QB Advisor actually lets you experiment by cutting and pasting useful sample programs right into your programming window. Only Microsoft has it. Only Microsoft could. And it's just one of the things you'll learn about new Microsoft® QuickBASIC version 4.5 for IBM® PCs and compatibles.

Another is the step-by-step tutorial that actually takes you through every stage of programming by working you through a complete program.

And QB Express—the interactive way to learn all about your programming environment in a matter of minutes—not hours.

Microsoft QuickBASIC also comes with Easy Menus that let you develop programs with

a minimum number of menu choices. Context-sensitive Help for immediate help with error messages and variables by simply punching a key, or clicking a mouse. And a built-in debugger that lets you see exactly what your program is doing, as it's doing it.

Best of all, Microsoft QuickBASIC is packed with enough power to handle whatever problems drove you to programming in the first place. Fact is, it translates your program into executable code at an incredible 150,000 lines per minute.

Microsoft QuickBASIC version 4.5. If programming is the only way out, this is the easiest way in.



Microsoft
Making it all make sense.™

This is for everyone too busy to get

If you're the type of person who's too busy to read an ad, read this ad.

Because you'll learn about a new tool that will help you manage people, ideas,

You can record the thousands of tasks you need to address to put together a new prod-

uct line. Or the thousands of factors you need to put together a new bottom line.

Agenda will not only file these random items of information for you, it'll help you arrange them any way you want.

So you can understand them better, formulate new ideas better and extract all the answers you need better.

Which means, now you can concentrate

Dump any random, unrelated thoughts or ideas into Agenda, and it'll help you turn that information into a stream of structured, actionable knowledge.

projects, and information with incredible efficiency. A tool that will help you avoid slumping into your chair, shaking your head, and asking, "How on earth will I ever get this done?"

We call it Lotus® Agenda®, the personal information manager.

Agenda allows you to dump random facts, thoughts, and ideas into your PC without having to structure the information in advance.

Agenda's filing system is a more sophisticated version of this filing system. You can put items anywhere you want. View them any way you want. And have access to them anytime you want.

File View Item Category Print Utility System Quit
New, Remove, Position, Assign, Discard, Undiscard

Scratchpad

Who Issues

- Forward product comparison articles to Joan. • Joan • Competitive Tracking
- Can we get the cost of goods sold under \$12? • Tom • Materials
- Bob will present ten-point incentives program at sales conference. • Bob • Bonus Dollars
- Tom will have his report in by a week from Friday; make sure it covers pricing, strategy, distribution, and implications of using outside vendor for typesetting and printing. • Tom • Distribution Vendors Pricing
- Decision needed on research budget by end of this week—discuss options with Jim and Joan. • Jim Joan • Research

Items. Dump information in manually, import it or use our pop-up capability while in another program.



everyone who's any work done.

File View Item Category Print Utility System Quit Column, Section, Management, Info			
Issues	Product Ideas	Who	Department
• Packaging	• Accept packaging bids until the end of October.	• Liz	• Operations
• Materials	• Make sure synthetic materials are reliable.	• Sue	• Operations
• Research	• Have Tom break down market research results into best case/worst case scenarios.	• Tom	• Marketing
• Distribution Vendors Pricing	• Tom will have his report in by a week from Friday; make sure it covers pricing, strategy, distribution, and implications of using outside vendor for typesetting and printing.	• Tom	• Marketing
• Distribution	• Do Tom and Bob think we need to adjust distribution mix?	• Tom • Bob	• Marketing • Sales

Categories. Agenda files items in all relevant categories so you can always find the information you need.

File: C:\AGENDA\FILES\ISSUES View: Issues by Person			
Joan		Priority	When
• Research	• Decision needed on research budget by end of this week-- discuss options with Jim and Joan.	• High	• 06/25/88
• Competitive Tracking	• Forward product comparison articles to Joan.	• Low	• 07/07/88
Bob		Priority	When
• Distribution	• Do Tom and Bob think we need to adjust distribution mix?	• High	• 06/22/88
• Bonus Dollars	• Bob will present ten-point incentives program at sales conference.	• Medium	• 06/29/88

Views. Looking at the same information through different views gives you a more informed perspective.

different ways so you can pinpoint information that's important to you. Or discover new relationships you hadn't considered before. And anytime you change an item in a view, Agenda will

more on using and acting on your information. And less on processing it.

How does Agenda work?

First, enter your items of information

automatically update all other categories where the item has been assigned.

In fact, you could say that Agenda recalculates your text the way a spreadsheet program recalculates numbers.

All of which means, from now on you'll be able to come in every morning, check your Agenda, and get right to work.

Because you'll immediately know what work needs getting to.

For \$15, we'll send you an Agenda demo kit or videotape. Call 1-800-345-1043 and ask for demo kit AKP-3058 for the 3.5" version or AKP-3053 for the 5.25" version. Or ask for videotape AKP-3063.

The whole idea behind Agenda is to get them all in a row.

into your PC and assign them to categories that you create.

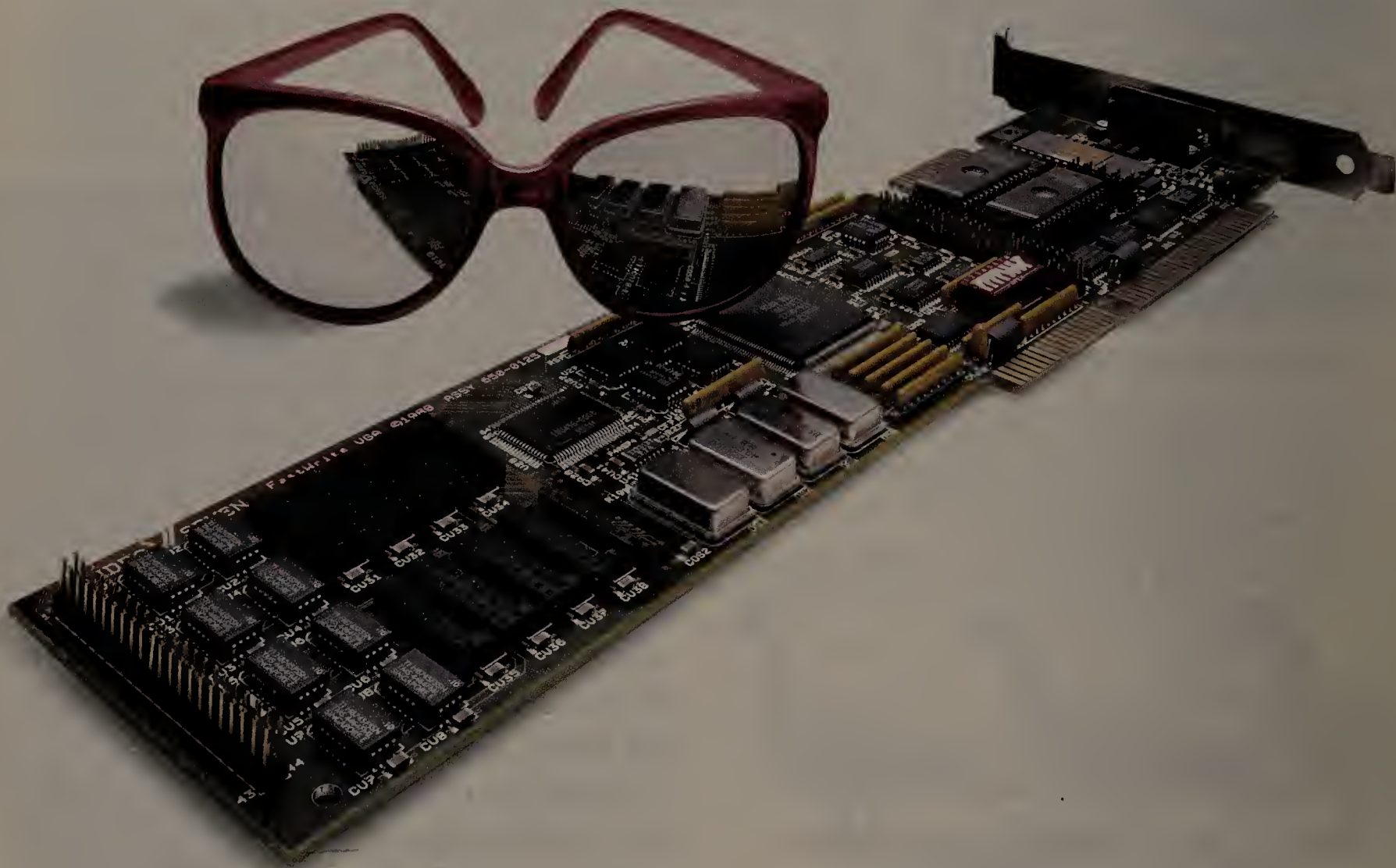
Then Agenda will do all of your filing automatically. And thanks to Agenda's *multiple filing capabilities*, if the information is relevant in more than one place, Agenda will take it and put it in several categories at once.

This makes it easy to view your data in

Introducing Lotus Agenda



Some People Buy FastWrite VGA™ For Its Blinding Speed.



And then again, some people buy it for its high resolution. Or its 100% hardware compatibility.

But whatever you buy it for, FastWrite VGA is guaranteed to give you VGA performance like you've never seen before. Because FastWrite VGA outperforms all competitive VGA boards. Pure and simple.

You see, this powerhouse surpasses standard IBM VGA in both color and resolution. Which means you get resolution up to 800 x 600 with 16 colors, or 640 x 400 with 256 colors.

We even offer a 256K memory upgrade that gives you 640 x 480 with 256 colors and our exclusive non-interlaced 1024 x 768 with 4 colors.

And not only is FastWrite VGA 100% register level compatible, it's also the only VGA solution that's form factor compatible. It has the same daughter card con-

nectors as the IBM PS/2 Display Adapter, to accommodate hardware add-ons in the future.

What's more, your current VGA software—or any you plan to buy—is guaranteed to run on FastWrite VGA. Even OS/2 products. It's backwards compatible with EGA, CGA, MDA and Hercules modes. So all your software will run faster than ever before.

Of course once you buy, you get free technical support, guaranteed VGA compatibility and a full five-year warranty. All for a price that won't leave you staring blindly into your wallet.

So visit your local dealer and find out more about FastWrite VGA.

We guarantee that you'll see the difference.

VIDEO  SEVEN

46335 Landing Pkwy., Fremont, CA 94538. (415) 656-7800.

The following are registered and unregistered trademarks of the companies listed: FastWrite VGA, Video Seven Inc.; Hercules, Hercules Computer Technology, Inc.; PS/2, Display Adapter, International Business Machines Corporation; Variable frequency monitor required for greater than 640x480 resolution. Monitor capable of 48 KHz needed for 1024x768. Video Seven reserves the right to change specifications without notice.



LETTERS

Reactions and responses from the PC World community

Big Blue Is a Big Mistake

I couldn't agree more with Richard Landry on IBM's arrogant attitude ["EISA: IBM's Canary in a Cage," *PCW*, November 1988]. The little guys have caught up with IBM, and they have the engineers and R&D budgets to create better machines. These companies aren't under the "profit pressure" that IBM is; it's obvious that Big Blue is still looking for the big bucks.

I'll have to make purchase decisions on a few hundred PCs in the next three to five years. Rather than be caught in the box canyon of IBM's closed-ended architecture, I'll join the EISA group in thumbing its collective nose at IBM.

*Richard Harlin
Elmira, New York*

Let My Programs Go

I liked Richard Landry's column on EISA, in particular his remark that OS/2 promises to run on many different systems. Should that become a reality, the major squeeze we business software users are currently feeling could disappear. It seems as if every new program version has an .EXE file 10 to 20 percent larger than its predecessor's, reducing the work space available for data by the same amount. A new architecture that would free

us from our 640K cage but still let us run the 1-2-3s, *Frameworks*, and *dBASEs* we're accustomed to would be a dream come true.

*Joseph H. Nestor
Greenville, New Hampshire*

Why Not a PS/2?

The debate over the Micro Channel continues among the technical cognoscenti, but the average user will be swayed by the fact that MCA-equipped PS/2s are twice as reliable as other PCs and cost half as much to maintain. That means that over the long run a PS/2 may well be cheaper than a name-brand clone. And that 10 percent edge in performance the speed demons provide won't look so good when your computer's in the shop.

PS/2s are 100 percent software compatible. And, as your December 1988 Buyers' Guide ["Everything You Need to Upgrade Your PS/2"] shows, hundreds of boards, adapters, and drives are available for Micro Channel machines. So why not buy a PS/2?

*Peter H. Strong
Los Angeles, California
(continues)*

Openness Is the Key

In "Keys to IBM's Future Success" [PCW, November 1988], Will Zachmann is right in saying that users don't want to be led back into the proprietary world. IBM should spend much less time building fences and more time building open systems with better technology.

I think IBM listens too much to Microsoft and too little to its clients.

George T. Thibault
Parsippany, New Jersey

Fair Play for Sprint

I'm somewhat displeased with your review of Borland's great new word processor, *Sprint* [The Software Shelf, PCW, November 1988]. After slogging through six or seven of the "popular" programs, including *WordPerfect*, *Microsoft Word*, *PFS: Professional Write*, and *Q&A Write*, I had concluded that a good, flexible word processor just wasn't possible. Enter *Sprint*. With its changeable key assignments and choice of interfaces, it is completely customizable.

As for "clunky formatting," phooey! With *Sprint*, you decide what you want and where you want it. Any system seems clunky if you aren't used to it. Take the time to learn *Sprint* before you run back to the old dinosaurs. I could give you a run-down of what's wrong with each of them—from *WordPerfect*'s demonic mnemonics and contortionist keystroke combinations to *Word*'s three-legged racehorse of

an interface—but I'll spare you.

Still, I appreciate the quality of information *PC World* provides, even if some of your reviews are whacked-out.

Gary Litwiller
Germantown, Maryland

Batch Capability Is Essential

Michael Goodwin's "Multitasking Without OS/2" [PCW, November 1988] was a constructive discussion of multitasking with the Intel 80386. There was no description, however, of the tools available within these environments for controlling and customizing the user interface—in other words, an equivalent of the DOS batch programming language. An example of such a tool is Softbridge Microsystems' Bridge/386 language for *Windows/386*.

Another significant issue for corporate users is the transition to OS/2 and Presentation Manager. Of the four operating environments reviewed, it appears that only *Windows/386* will enable users to truly multitask and integrate existing DOS applications with programs (like *Excel*) that will be available under both *Windows* and *Presentation Manager*. I hope Mr. Goodwin will further enlighten us on these important issues in a future review.

C. Lawrence Meador
Cambridge, Massachusetts

Forget the "Please," Please

I couldn't agree more with Joan Hope's comments in *Another Angle* ["Plain English, Please,"

PCW, November 1988]. How many more people would buy computers if the machines were accompanied by understandable documentation?

James W. Bassett
Eagan, Minnesota

He Doth Believe in Hope

I have only one word to add to Joan Hope's "Plain English, Please": Amen!

Donald Balbo
Las Vegas, Nevada

Down With Tech

Cheers to Joan Hope for her suggestion that "computer vendors find a different kind of writer to prepare their instruction manuals." Like Ms. Hope, I agree that we need information written by people who understand the common user's problems and who can document them in plain English. I have yet to find a plain English manual or magazine geared toward someone like me—an average PC user.

Gilda Brock
San Francisco, California

Slow Down, Then Boot Up

Joan Hope's complaint is typical of people who don't expect to invest some time learning how to use their PCs. My advice: Treat learning about the PC as you would any new, complex skill. No one would expect to be able to
(continues)

Power without pain.

Viewing Customer table with form F: Record 1 of 315 Main

Borland Order Information Form

Customer Identification

Customer ID #: 5
 Customer's Name: George Bartelshay
 Address: 518 Pine St
 City, State, Zip: Manchester, 4JT
 Country: England

Customer Demographics

Age: 38
 Sex: M
 Credit Balance: 900.00

Product Order Information

Product Code	Description	Language	Qty	Price
PB1-E	Paradox 3.0	English	1	725.00
PB12-E	Paradox OS/2	English	1	725.00
TLC-E	Turbo C	English	2	149.95
TLP-E	Turbo Pascal	English	1	149.95

Multi-table form dynamically displaying information from three related tables.

You don't have to be a programmer to have easy access to our highly sophisticated, powerful relational database, Paradox® 3.0.

Paradox 3.0 is all powerful and never painful because *it* makes all the complex inside moves, you don't. While it does the complex for you, the complexity is hidden beneath clear, natural, even intuitive pathways and patterns that make life easy for you.

With Paradox 3.0, there are no Unclears, no Unknowns. You don't need an army of in-house technical support people. And best of all, you *don't have to be a programmer* to be a pro with Paradox. It's all gain, no pain.

“Query-by-Example” for example

Use this checkmark and you're using QBE. It's that easy. Let's say you need to know in a hurry which of your Los Angeles customers bought more than 5 pairs of white shoes. First ✓ the customer field, then type “LA,” “white,” and “>5,” and you're done. Paradox gives you the right answer right now. And how much programming to do all that? Zero.

If your database experience so far is limited to the flat-file type rather than relational, or even if a

60 day money-back guarantee*

*Customer satisfaction is our main concern; if within 60 days of purchase this product does not perform in accordance with our claims, call our customer service department, and we will arrange a refund. All Borland products are trademarks or registered trademarks of Borland International, Inc. Other brand and product names are trademarks or registered trademarks of their respective holders. Copyright ©1988 Borland International, Inc. BI-1307

spreadsheet is the only program you've used before, Paradox gets you up and running immediately with just a ✓.

Record-locking and Auto-Refresh make the network safely network

Paradox has become the leading networker because it handles multi-users intelligently. If someone in your group or network has accessed a record, automatic record-locking keeps everyone else from changing it.

That way, two or more people can't change the same data at the same time. (As a bonus, Paradox also tells you *who* is using a record at a particular instant.)

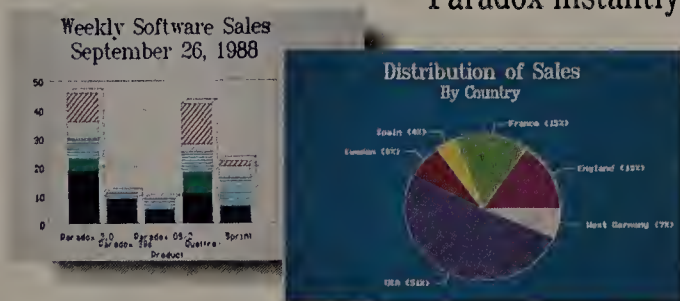
Once the record has been changed by someone in the network, *Auto-Refresh* kicks in *automatically* and updates everything. Everyone in the network is looking at up-to-the-minute information.

Paradox, for the looks of things

Presentation-quality graphics are another Paradox distinction. They give you and your work the professional look.

Paradox instantly turns your tables into graphs with

one keystroke—and in multiuser environments, with a few keystrokes your graph can show up-to-the-minute changes. Not only does everyone get the picture, they get an accurate picture.

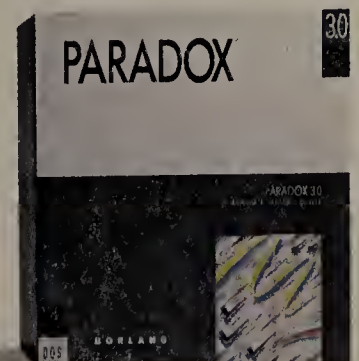


Award-winning Paradox Family

Paradox 3.0 is the latest addition to the award-winning Paradox Family. Paradox OS/2 and 386 received PC Magazine's BEST OF 1988 AWARD in the database category.

it out

To order a trial version of Paradox 3.0 (\$14.95) or a demonstration disk (\$4.95), call (800) 345-2888, extension 100. Paradox owners may upgrade (\$175.00) by calling (800) 331-0877. (Please have your serial number available.)



B O R L A N D

play the piano or speak French in a few days. If you want to add significant new skills to your repertoire, it's going to take a little work.

I was happy to see that the author said she would "invariably end up calling friends for help." They are the best source of correct, concise answers—and they don't put you on hold.

Terry Rich
Dickinson, North Dakota

Modem Test Mode Is Malapropos

The Zoom HC 2400 modem review in your November 1988 *Hardware Shelf* included NSTL testing, which, on the face of it,

seems like a good idea. But most readers will use this modem primarily in originate mode, and your tests were conducted in answer mode, making the test results useless.

Henry Gardiner
Plano, Texas

You're right. Although the Zoom HC 2400 evaluation used both originate- and answer-mode testing, a table showing originate mode results would certainly have been more useful to most readers. Future modem evaluations will include originate-mode test results. We regret the error. —Ed.

Arnold Harris for President

I would like to thank you for running Mark Marek's "Two-Fisted Management" in your pages. Although I am sure that its creator didn't intend the strip to be taken seriously, it is refreshing to see a character like Arnold Harris who is totally devoted to the most maligned, hated, feared, and moral economic system known to man: capitalism.

Mark A. Penman
Cleveland, Ohio

A Clarification From NEC

I was pleased to see your timely coverage of NEC's three new
(continues)

Q.

"Where Do I Turn For More Information?"

A.

- 1.** Turn to the Reader Service Card at the back of this issue of *PC World*.
- 2.** Find the Reader Service number of the product you want in the product or advertiser indexes.
- 3.** Circle the number, fill out the postage-paid card and send it in. It's that simple.

In return, our advertisers will send you more information on the products you want. It's just another way that *PC World* helps you make the best buying decisions for your company.

PC WORLD

Of the more than
250 hardware products reviewed
by InfoWorld in 1988,
our CompuStar® received
the highest total score awarded.

CompuStar®



Simply stated, it's number one.

CompuStar is the world's first and only multi-processor, convertible bus™ microcomputer. It can be configured with up to 13 bus expansion slots (PS/2 and/or PC/AT compatible), your choice of interchangeable 8086, 80286, or 80386 microprocessors and up to seven disk/tape devices.

To receive a reprint of the InfoWorld review, as well as a complete CompuStar product information kit, call 803/796-7800.



Wells American®

Corporate Headquarters: 3243 Sunset Boulevard • West Columbia, South Carolina USA 29169 • 803/796-7800 • FAX 803/796-7832

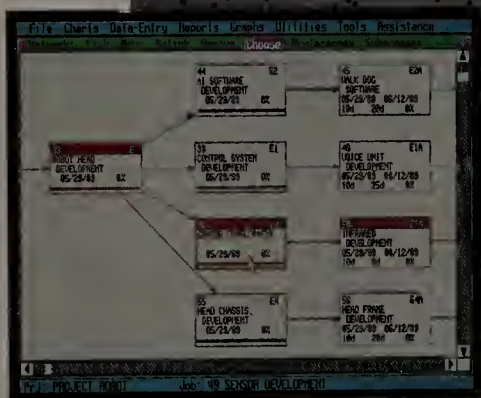
PS/2, Personal Computer AT and AT are trademarks of International Business Machines.

Circle 216 on reader service card

Announcing
Version 1.5

"Project Scheduler 4. The difference is graphically clear."

ROGER MEADE, PRESIDENT, SCITOR CORPORATION



**"I brought the excitement
back to project management with a
product that really works for you."**

"Software products claiming to be #1 in project management aren't living up to their boasts. They have evolved by tacking new power features onto outdated versions at the expense of speed and usability. Their basic reports continue to be confusing and unreadable.

"I challenged my development team to build a

totally new product with unmatched speed, power, and ease-of-use. They met this challenge with Project Scheduler 4.

"Project Scheduler 4 is the first PC-based package that integrates high-resolution graphics with all the management tools you need. You understand more because you see more on the screen. At last, PERT and Gantt charts make sense. And responsibilities, deadlines,

and resource bottlenecks are all spotted at a glance.

"You see more on paper, too. Project Scheduler 4 gives you graphic reports that minimize tedious cut-and-paste assembly. They're instantly understandable. Not to mention simple to generate for impressive presentations.

"Because scheduling is primarily a visual process, Project Scheduler 4 uses an intuitive, graphic

interface that gives you a clear view of the big picture. Gone are hard-to-remember commands and keystroke sequences. Here is the future of advanced productivity tools!"

For more information and a brochure, call or write:

415/570-7700

250 Lincoln Centre Drive
Foster City, CA 94404

Scitor
Corporation

FREE GIFT!

And 44%
Savings if You
Subscribe Now.

This
PC World
see-through
solar calcu-
lator can be
yours FREE just
for subscribing to
PC World. Your
special gift features:

- Amazing crystal-clear body with invisible circuitry
- Credit card size convenience
- Multi-function memory
- Special function keys: square roots, automatic percentages, etc.
- Easy-to-read liquid crystal display
- Advanced solar panel cell—it never needs batteries!

It's all yours FREE with your subscription to *PC World*, the magazine for PC decision-makers. Every month, we show you the personal computing world the way no one else will. In-depth product reviews and recommendations. Tips from power users to make YOU more valuable. Industry developments; columns, features. . . *PC World* doesn't just tell you what's happening today, it tells you what to expect tomorrow.

Don't wait. If you act now you can have a full year of *PC World* for only \$19.97—that's almost 44% off the cover price. Plus you get the amazing *PC World* see-through solar calculator—FREE with your subscription to *PC World*.



Rush me my FREE GIFT and one year (12 monthly issues) of *PC World* for only \$19.97. That's almost 44% off the annual cover price and over 33% off the regular subscription rate of \$29.90.

NAME _____

COMPANY _____

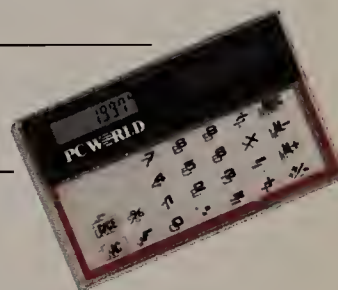
TITLE _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PC WORLD

4CN70



SOLUTIONS!

Rush me my FREE GIFT and one year (12 monthly issues) of *PC World* for only \$19.97. That's almost 44% off the annual cover price and over 33% off the regular subscription rate of \$29.90.

NAME _____

COMPANY _____

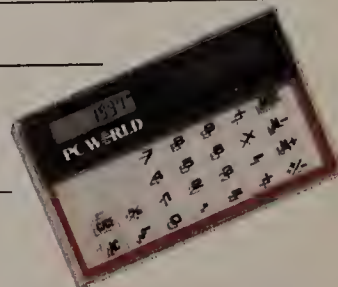
TITLE _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PC WORLD

4CN70



ORDER NOW!

44% Savings and a Special FREE GIFT.
See other side for details.



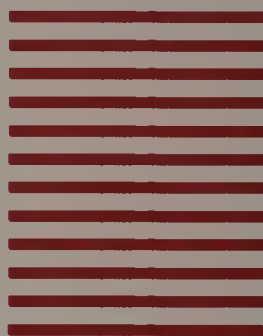
BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
Subscription Department
P.O. Box 51833
Boulder, Colorado 80321-1833

NO POSTAGE
NECESSARY
IF MAILED IN
THE UNITED STATES



Mail the
attached
card today.
See other side
for details.



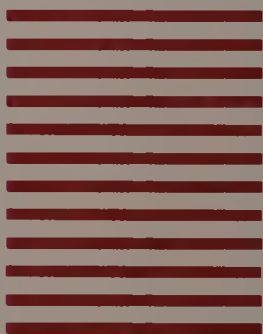
BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
Subscription Department
P.O. Box 51833
Boulder, Colorado 80321-1833

NO POSTAGE
NECESSARY
IF MAILED IN
THE UNITED STATES



Mail the
attached
card today.
See other side
for details.



this.



Send And Receive Fax Right From Your PC

#1 JT Fax

The Best Selling
PC Fax In
America

PC Computing

**MOST
IMPORTANT
PRODUCT
OF THE
YEAR**

DEC 1988

PC WORLD
BEST

BUY

1988

PC
MAGAZINE
EDITOR'S
CHOICE

JAN 1988

**INFO
WORLD**

**PRODUCT
OF THE
YEAR**

**READER'S
CHOICE
POLL**

1988

From
\$395

**JT Fax internal and portable 4800 baud models for PC/AT/XT and PS/2.
9600 baud board with optional modem daughter card.**

Call to order the right JT Fax for you.

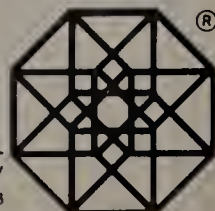
1.800.548.3420

In Georgia: (404) 564-5566 Fax: (404) 564-5528

QUADRAM

An Intelligent Systems Company
One Quad Way, Norcross, Georgia 30093

Quadram logo and JT Fax are trademarks of Quadram



Circle 168 on reader service card

PC Voice Mail, now only \$199.

For an ear-opening telephone demo call:
1-800-6-WATSON

Now get a combined PC-based voice mail, data modem, and telephone answering system—from only \$199. With Watson, you'll *profitably* improve your business communications with clients, colleagues, sales and service reps, field staff, vendors.

Benefits Of A \$20,000 + Voice Messaging System Or "Personal Receptionist" For As Low As \$199

Look at all of these advanced features:

Voice Mail—Watson's automatic telephone answering lets callers leave and receive messages of any length 24 hours a day, 7 days a week. Ends "telephone tag" with clients and colleagues. Forwards messages automatically to mobile phones and pagers. Retrieve messages from any touchtone phone—even a car phone. Never miss an important call! And Watson provides "big system" professional sound quality!

Up To 750 Private "Mailboxes"—Give up to 750 of your colleagues or clients an individual, confidential "voice mailbox." Use them to receive private messages or record special messages for individual callers.

Electronic Telephone Book—In one key-stroke, access any of up to 750 telephone numbers, then use automatic dialing and re-dialing if busy. Store key information on contacts and get it immediately when you need it.

Hayes-Compatible Data Modem—Comes complete with 1200 BPS Hayes-compatible

modem (or optional 2400 BPS modem). Transfer your data files and access Telex, E-Mail, Dow Jones, or other public databases.

Simultaneously Run Popular Business Programs—Run programs such as Lotus 1-2-3 while Watson records or delivers messages.

Plus—Watson efficiently guides callers through the options they have in leaving messages... Delivers special pre-recorded messages to individuals at pre-determined times... Automatically forwards messages to other telephone lines or numbers... Provides an electronic calendar with automatic alarms and telephone notification.

30-Day Risk-Free Trial Installation

Try Watson for 30 days. If you aren't 100% satisfied, send it back for a prompt and full refund. No questions asked.

Demo Hotline

For a telephone demo call 1-800-6-WATSON EXT. 122 (In MA 1-508-651-2186 EXT. 122). Touchtone EXT. 122 and receive a free five pack of diskettes if you purchase.

Order Hotline

To order Watson call 1-800-533-6120 EXT. 122 (In MA 1-508-655-6066 EXT. 122). Touchtone EXT. 122 and receive a free five pack of diskettes with purchase. Price: \$199. For optional 2400 BPS modem add \$100. MasterCard, VISA, and American Express accepted. Credit card or check must accompany order.



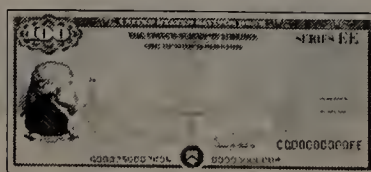
Watson®

Natural Microsystems Corporation, 8 Erie Drive, Natick, MA 01760-1313

OVER 30,000 SOLD

Circle 63 on reader service card

Portrait of the Great American Investor



She'll go wherever the story takes her. She invests her time in her work and her money in U.S. Savings Bonds. Bonds now pay competitive rates, like money market accounts. Find out more, call 1-800-US-BONDS.

U.S. SAVINGS BONDS
THE GREAT AMERICAN INVESTMENT

Bonds held less than five years earn a lower rate.

laptop products in the November 1988 issue of *PC World* [Preview, "Laptops of Luxury"]. However, I would like to clarify for your readers a few of the key differences between the NEC ProSpeed 386 and its sibling, the NEC ProSpeed 286.

The preview implied that other than their dissimilar processors, the two machines were essentially identical. In fact, the ProSpeed 286's different overall design renders it 4 pounds lighter and 20 percent smaller than the ProSpeed 386. And unlike the 386 machine, the ProSpeed 286 offers black-and-white VGA graphics and is designed primarily for battery-powered operation. In addition, the cable-connected Expansion Station for the ProSpeed 286 provides extensive rather than "garden-variety" features, including slots for four standard 16-bit boards and space for one half-height drive.

Thanks for allowing me to clarify these important points and for your continued excellent coverage of the fast-paced laptop computer market.

James D. Bartlett
Manager, Strategic Marketing
NEC Home Electronics
(U.S.A.) Inc.
Wood Dale, Illinois

Corrections

The phone number listed for Zenith Data Systems in two December 1988 *PCW* articles, "Laptops With Storage to Spare" and "VGA Monitors—Cheap and Smart," is incorrect. For more (continues)

PC WORLD ANNOUNCES
THE 1989 WORLD CLASS AWARDS

Vote

**LET YOUR VOICE
BE HEARD**

and win a "Super PC
System" and other
prizes
worth over
\$50,000!

for your

favorite

PC

products

Let the PC industry know exactly what you want. Grab a pen
and vote for your favorite PC hardware and software. You may
also win prizes worth over \$50,000—**just for voting!**

**GUARANTEED
PRIZES**

See
Inside

HOW TO ENTER

Voting for PC WORLD's 1989 World Class Awards is easy. Simply write the names of your top-rated products on the ballot on the opposite page and return it to PC WORLD. The product receiving the most votes in each category will be designated a World Class winner. We will announce the award winners (and runners-up) in the October 1989 issue of PC WORLD.

HOW TO WIN

When you mail your ballot, you'll be doing more than simply voicing an opinion—you'll also make yourself instantly eligible for a host of prizes worth over \$50,000!

First prize will consist of what we call the Super PC System: the highest-rated desktop computer plus the winning hardware and software products in over 30 categories!

Second prize will be the most popular transportable computer, and the third-prize winner will receive the heaviest hitter in a lightweight category—the winning laptop computer.

Don't delay; remember, PC WORLD is also giving away special prizes to the first 100 readers who send in their ballots. So let your voice be heard throughout the PC industry. Cast your ballot for PC WORLD'S 1989 World Class Awards today!

CATEGORY DESCRIPTIONS

To help you cast your votes, we've supplied background information on those product categories that may not be self-explanatory.

► *Dot Matrix/NLQ Printer*

Dot matrix printers that provide a draft-quality print mode or combine dot matrix and near letter quality (NLQ) print modes.

► *Monitor*

VGA, EGA, color, monochrome, or "paper white" displays.

► *Memory Expansion Board*

Boards that supply additional conventional or expanded (EMS) system memory. Boards in this category may also include a clock/calendar and parallel or serial ports.

► *Graphics Board*

Boards that offer VGA, EGA, CGA, or Hercules-compatible graphics. Please specify whether your chosen board is monochrome or color.

► *Mass Storage*

All forms of mass storage, such as hard disk drives, removable high-capacity drives, optical disk drives (WORM and CD ROM), and tape backup units.

► *Input Device*

Scanners, mice, keyboards, digitizing tablets, light pens, and so on.

► *Local Area Network—Network Board*

First-place winner in the two local area network (LAN) categories are the only products that will not be given away. But we'd still like to know which LAN you think merits the most attention. In this hardware category, we're looking for the names of expansion boards that link PCs in a LAN (not the name of the network's file server).

► *Word Processing Utility*

Outline processors, spelling checkers, grammar and style checkers, thesauruses, and more.

► *Desktop Publishing*

Programs used for page layout, font creation, editing, integration of text and graphics, and typesetting that support page formatting and laser printer fonts.

► *Desktop Publishing Utility*

Drawing and painting programs, image capture and manipulation programs, clip-art collections, font generators, special printing utilities, downloadable font libraries, and more.

► *Spreadsheet Utility*

Programs that add features or enhance existing spreadsheet functions such as add-in word processors and data base managers, file-compression programs, macro managers, and special printing utilities. Also, templates designed for specific spreadsheet tasks such as tax preparation and financial analysis.

► *Relational Data Base*

Powerful relational data management programs that feature large record capacities, sophisticated query systems, full-blown report writers, text import and export capabilities, and command languages.

► *Flat-File Data Base*

Flat-file data management programs that operate on only one file at a time and are often used to maintain mailing lists, contact lists, and the like.

► *Utility*

Programs that perform functions not typically provided by the operating system, such as file recovery, management, or conversion; macro and keyboard enhancement; disk emulation; and printer support.

► *Communications*

General and remote communications programs, packages dedicated to gathering electronic mail, and micro-to-mainframe communications packages designed for terminal emulation and data conversion.

► *Desktop Organizer*

Products that replace such deskbound aids as a Rolodex, notepad, adding machine, appointment scheduler, phone directory, and others.

► *Integrated*

Programs that incorporate several applications—usually word processing, spreadsheet, graphics, and data management—and share an interface, a com-

mand structure, and data. The applications may be tightly integrated or in separate modules.

► *Operating Environment*

An operating system or extension, often called a windowing environment, that allows you to run a number of off-the-shelf applications at once and easily share data among them.

► *Business Graphics*

Programs that produce several types of charts and are used for business presentations.

► *Computer-Aided Design*

Programs used for drafting and modeling by designers, engineers, and architects.

► *Personal Finance*

Programs that monitor personal finances, keep household records, or organize personal data. Also includes personal investment programs that perform portfolio management, technical analysis, fundamental analysis, and stock information retrieval.

► *Local Area Network—Network Operating System*

This product (along with the first-place LAN network board) will not be awarded, but we'd like to know which network operating system you think is the best.

► *Most Promising Newcomer*

Vote for the recent software and hardware arrivals you feel have had the greatest impact. *Recent*, in this case, means the product was released after September 1, 1988. You may vote for a product you've already cited in another category.

GUARANTEED PRIZES
to the first 100 readers
who send in their ballots

1989 WORLD CLASS AWARD BALLOT ENTRY FORM

Dear Reader: Please use this entry form to vote for products you are familiar with and would recommend, based on their performance and value. Choose one product per category; you don't have to vote in all categories. Eligible products must be IBM PC compatible and commercially available as of March 1, 1988. Note: To ensure accuracy, a vote will not be counted unless the following three items are provided: (1) manufacturer's name, (2) name of product, and (3) model number for hardware, version number—if applicable—for software. Please print or type your entry and submit it by April 15, 1989.

Name _____
Company _____
Address _____ State _____
City _____ Daytime phone _____
Zip _____

HARDWARE

	Manufacturer	Name of Product	Model Number	
Sample Entry	XYZ COMPANY	PERFECT PC 286	16	
Desktop Computer (first prize)				1
Transportable Computer (second prize)				2
Laptop Computer (third prize)				3
Dot Matrix/NLQ Printer				4
Laser Printer				5
Monitor				6
Modem				7
Memory Expansion Board				8
Graphics Board				9
Mass Storage				10
Input Device				11
Local Area Network—Network Board				12
Most Promising Newcomer—Hardware				13

SOFTWARE

	Manufacturer	Name of Product	
Sample Entry	XYZ COMPANY	TOP WORD (2.1)	
Word Processing			14
Word Processing Utility			15
Desktop Publishing			16
Desktop Publishing Utility			17
Spreadsheet			18
Spreadsheet Utility			19
Relational Data Base			20
Flat-File Data Base			21
Utility			22
Communications			23
Desktop Organizer			24
Programming Language			25
Integrated			26
Operating Environment			27
Game			28
Business Graphics			29
Computer-Aided Design			30
Accounting			31
Tax Planning or Preparation			32
Personal Finance			33
Local Area Network— Network Operating System			34
Most Promising Newcomer—Software			35

DETACH ENTRY FORM AND MAIL TODAY!

**Vote
for your
favorite
PC
products**

**GUARANTEED
PRIZES**

**See
Inside**

CONTEST RULES

Each person may enter the contest only once. Type or print your choices on the entry form on the opposite page. Employees of product manufacturers are eligible to vote for any products other than those sold by their company.

Your entry must include your name, address, and daytime telephone number. Entries must be postmarked no later than April 15, 1989. Employees of PCW Communications and their immediate family are not eligible. Please tape (do not staple) the form closed when mailing.

FOLD HERE AND MAIL TODAY! PLEASE TAPE. DO NOT STAPLE.

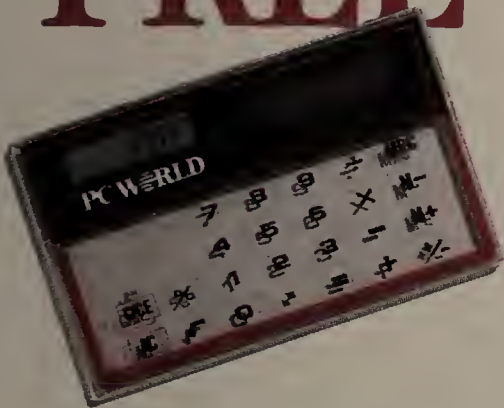
PLACE
STAMP
HERE

**ATTN: PC WORLD RESEARCH DEPARTMENT
1989 World Class Awards Ballot**

**PC WORLD
501 Second Street
San Francisco, CA 94107**

FREE GIFT!

And 44% Savings
If You Order Now!



This *PC World* see-through solar calculator can be yours FREE just for subscribing to *PC World*. Your special gift features:

- Amazing crystal-clear body
- Credit card size
- Multi-function memory
- Special function keys
- Liquid crystal display
- Advanced solar panel cell—it never needs batteries!

☐ Rush me my FREE GIFT and one year (12 monthly issues) of *PC World* for only \$19.97. That's almost 44% off the annual cover price and over 33% off the regular subscription rate of \$29.90.

NAME _____

COMPANY _____

TITLE _____

ADDRESS _____

CITY/STATE/ZIP _____

*Don't wait. If you act now you can have a full year of *PC World* for only \$19.97—that's almost 44% off the cover price.*

PC WORLD

4CN62



NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
Subscription Department
P.O. Box 51833
Boulder, Colorado 80321-1833



How to speed up your accounting cycle

► Whether you're shopping for your first computerized accounting system or wrestling with some other "solution", you owe it to yourself to see why Bedford's Integrated Accounting software is acclaimed as the **fastest** and **easiest** way to get your small business from transaction to report.

Quick to setup...

Installation is as easy as copying the single program file onto a working disk and typing BEDFORD.

Easy to learn...

Within minutes you will be breezing through the six fully integrated modules using only cursor and escape keys. Sample data files and a self-paced tutorial allow you to get comfortable with the program before entering your own company's data.

If you require additional help, our exclusive Comfort Guarantee provides free technical support and program updates for your first thirty days.

A snap to use...

With Integrated Accounting you'll need to enter transactions only once.

Payroll, Payables and Receivables data are instantly transferred to General Ledger, Inventory and Jobcost as required.

On-screen lists of your chart of

Unlike other software that was never built for speed, Integrated Accounting has been optimized to give your small business the boost it needs.

accounts, suppliers, customers, employees and inventory pop up automatically when needed.

PC **EDITOR'S CHOICE**
MAGAZINE September 1987

Integrated Accounting topped 15 other programs to win this prestigious award

If you need your bottom line in a hurry or a quick check of a client's payment status, a few keystrokes is all it takes to display any report instantly.

Stop wasting time...

Blast down to your nearest Bedford dealer, Egghead Discount Software or Radio Shack store today and, for only \$249 complete, let Integrated Accounting show you the easiest way to speed up your accounting cycle.

Call 1-800-255-8361 to order.

Timeslips interface now available.

bedford
making software comfortable™



Bedford Software Corporation • 15311 N.E. 90th Street • Redmond, WA 98052 • Fax (206) 885-0859 • (206) 883-0074

MS-DOS is the registered trademark of Microsoft Corporation • Making Software Comfortable and Integrated Accounting are trademarks of Bedford Software Corp. • © Copyright 1988, Bedford Software Corp. - All rights reserved.

Circle 29 on reader service card



*The original AnthroCart. Mobile.
Incredibly strong. So many ways to solve
your space and equipment problems.
Choose different sizes. Move
shelves around. Add space saving
options.*

*AnthroCart. Well designed
Technology Furniture.*

Look for our name.

AnthroCart®

Call us for more information: 800-325-3841



Made in U.S.A.
All steel frame construction
Easily holds up to 150 lbs.



*AnthroCart and Technology Furniture are
registered trademarks of Anthro.*

**Anthro®
Technology Furniture®**

3221 N.W. Yeon St.
Portland, OR 97210
503-241-7113
Telex: 940103

LETTERS

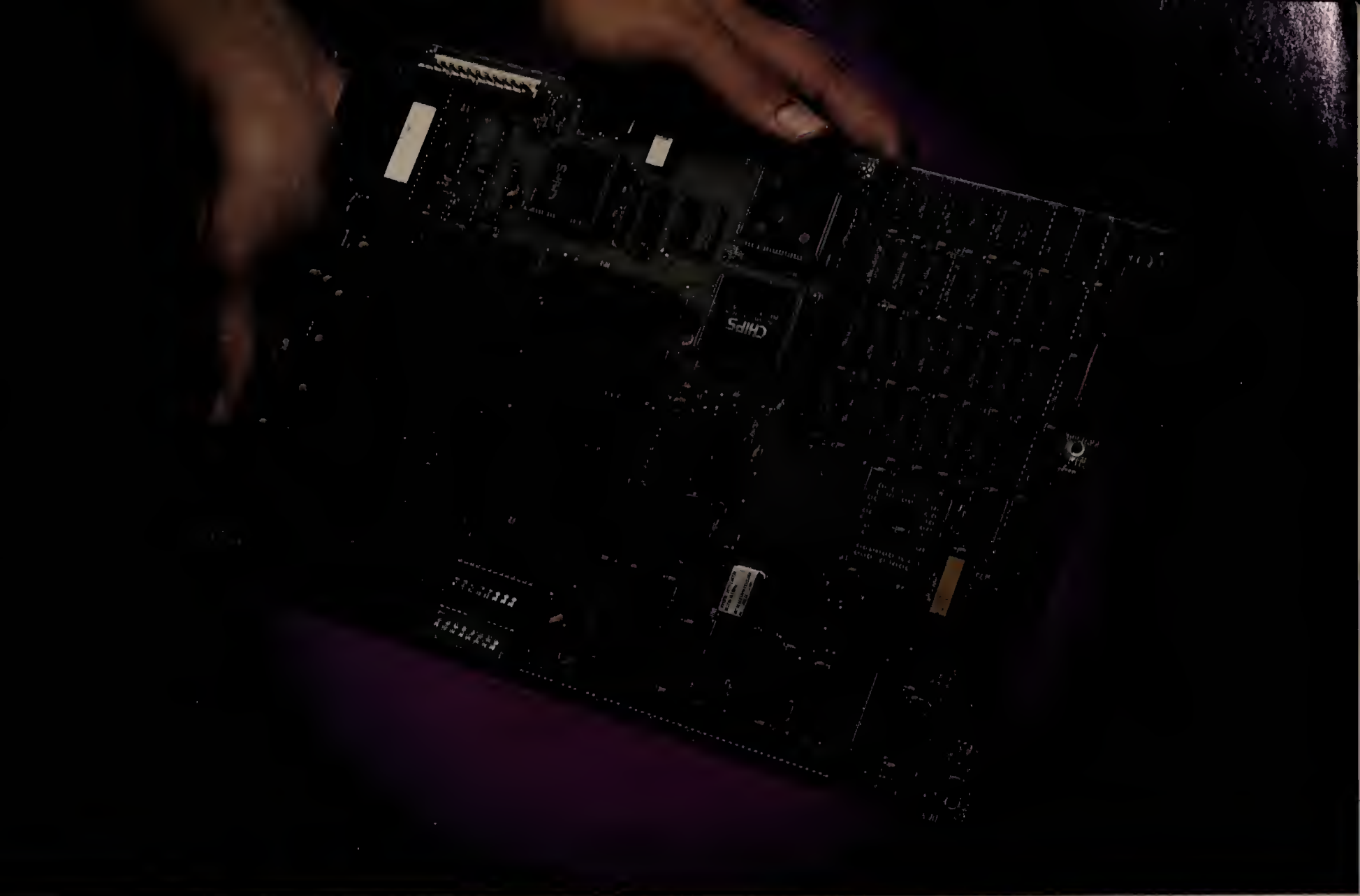
information on Zenith products, call 800/842-9000.

December's VGA monitor review also contained errors relating to the products themselves. The list price of the Zenith ZCM-1390 monitor is \$699, not \$799 as reported, and the dot pitch of the Zenith ZCM-1490 is .28, not .31. And as of May 1988, a tilt-and-swivel stand is included as a standard feature of the ZCM-1490. Contrary to the article, the Magnavox Professional VGA has both vertical-size and vertical-hold controls and comes with a two-year rather than a one-year parts and labor warranty. Had these facts been reported, the Zenith and Magnavox monitors would have received more favorable evaluations.

In the same issue, "Buyers' Guide: 20-MHz 386 Systems" listed an incorrect address for Fivestar Computers. The company may be contacted at 1621 W. Crosby #112, Carrollton, TX 75006; 214/242-7000. We regret any inconvenience this has caused our readers.

The same Buyers' Guide—as well as the review "Surprise Values at 20 MHz," also in the December issue—gave an incorrect address and phone number for AT&T. The correct address is 8000 Baymeadow Way, Rm. 1-2-099, Jacksonville, FL 32256; 800/247-1212.

To send correspondence or to submit material for publication in this column, please see How to Contact PC World, page 4. ●



CONVERT YOUR PC, XT OR AT INTO A HIGHER FORM OF LIFE!

Don't let your PC give up the ghost — Hauppauge has arrived with a new spark of life: the 386 MotherBoard.™ Far more advanced than an accelerator card, our line of MotherBoards grace your PC, PC/XT, PC/AT or compatible with speeds equal to the IBM PS2 Model 80. And faster. Because we've built in 1 Megabyte of high speed RAM and a 387 math coprocessor socket for speeds that will make your PC glad to be alive.

UNIX/386 and OS/2 Compatible. To ensure a long, fruitful life, our 386 MotherBoards are compatible with the PC/AT (BIOS and I/O) — so you can run the new generation of DOS, OS/2. Our Boards also run Windows/386, UNIX V, PC-MOS/386, and XENIX/386. For *more* power, you'll find 16-bit expansion slots that accommodate the latest I/O expansion cards. Plus, we can add up to 15 Megabytes of extended memory. No 386 accelerator card can give you so much versatility. **Only our 386 MotherBoards give your PC an unlimited future!**

The Critics Applaud! *PC Magazine* awarded our Board "The Editor's Choice" for 386 Replacement Boards. *PC World* called it "the Upgrade Product of the Year." And *PC Computing* said: "The 386 MotherBoard is exceptionally compatible with existing IBM applications and peripherals — it will even run IBM's own version of OS/2."

Technical Features ■ 16 or 20 MHz 80386 ■ 1 Megabyte of 100 nsec 4-way interleaved RAM ■ PC/AT compatible I/O and BIOS for support of OS/2 ■ Six 8-bit expansion slots and two 16-bit expansion slots (four on 386 MotherBoard for AT) ■ One 32-bit expansion slot for up to 15 Megabytes of high speed memory.

386 MotherBoard for the PC, PC/XT, or Compaq portable	\$1695
386 MotherBoard for the PC/AT	\$1795
386 MotherBoard/20 MHz for PC/AT	\$2195
32-bit RAM Board	from \$195
16 MHz 80387 math coprocessor	\$695
16-bit combination hard disk/floppy disk controller	\$245
prices subject to change	

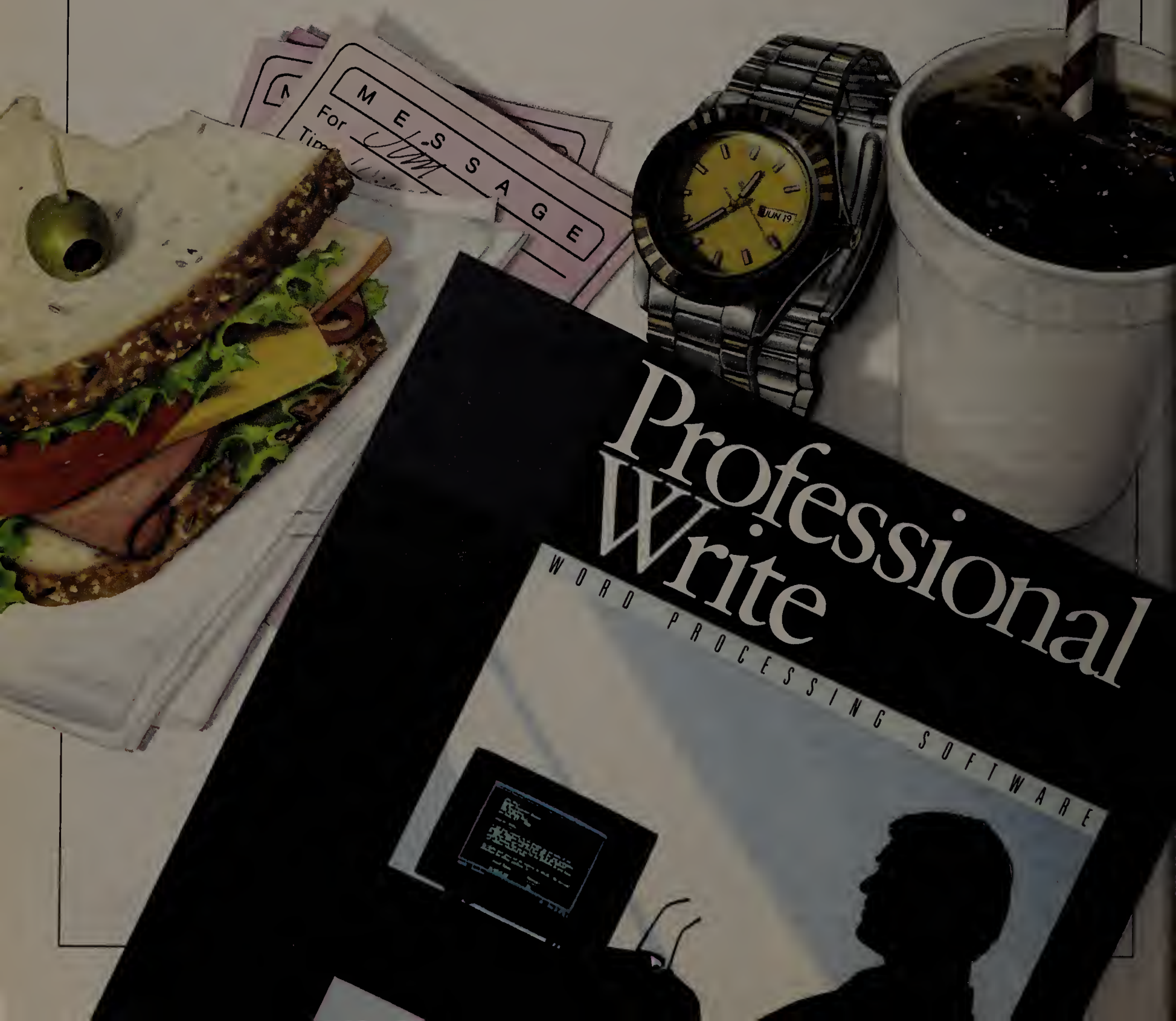
Our 386 MotherBoard will give your computer a big step up. For more information, call: **1 (800) 443-6284**. In New York: **(516) 434-1600**. All our products are available at your local computer dealer. (Ask about our GSA pricing!)

Hauppauge Computer Works, Inc.
175 Commerce Drive,
Hauppauge, New York 11788.
(In West Germany call: 0211-594-320)

Hauppauge!

— Trademark of IBM, PC, AT, PS2 and OS/2: IBM.
Intel 386: Intel Corp.; Windows/386: Microsoft Corp.

Today's managers
are expected to learn
word processing
in their spare time.



NEW VERSION 2.0

Fortunately, that's all it takes.



Can Professional Write significantly reduce the time and cost of your training and support? Call 1-408-848-4391, Operator #60 for a free trial disk.

Truth is, the best business people have the least spare time. So Professional Write 2.0 was designed to get them up and running immediately.

Professional Write 2.0 has all the features managers demand, and saves them the frustration of learning programs designed for full-time typists.

Our learning process speeds up the word process.

Anyone can learn Professional Write in a couple of hours. The screen is as familiar as a piece of paper. Pull down menus and an on-line manual means there's nothing to memorize. Our follow-along tutorial is written in plain English, and our context-sensitive help is one of the best available.

It all ensures that your managers spend their time managing, instead of asking for help.

We're the most compatible with your secretaries.

We gave Professional Write the most extensive and direct connections with the other software standards in your office. No other program does it so easily. Professional Write has built-in compatibility with MultiMate™, WordPerfect™, Microsoft Word™, WordStar™, Wang™ PC, DCA, and ASCII. You can directly import Lotus 1-2-3™ worksheets without retyping; include a chart from Harvard Graphics when printing; and mail merge quickly with dBase III™ files.

We give your printers the perfect set-up.

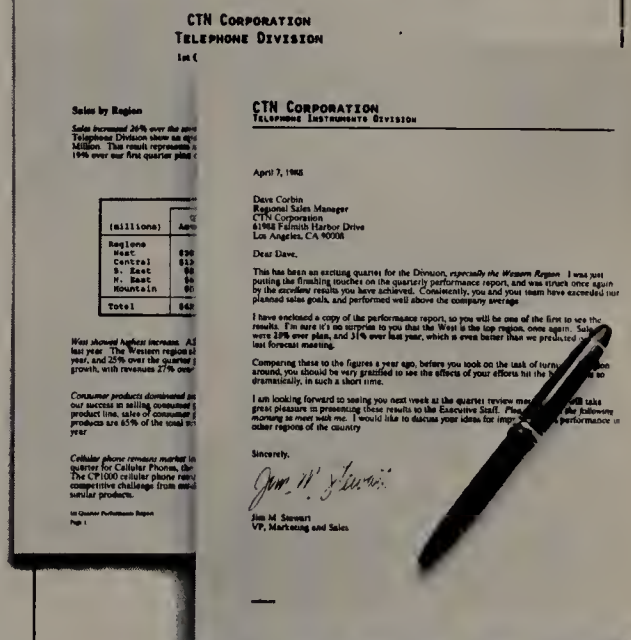
Now using multiple fonts with an HP Laser Jet™, Apple LaserWriter™, PostScript™ or HP DeskJet™ is as simple as underlining. And printer support has never been easier, because Professional Write is pre-configured for quick installation.

We have a fast new way to find your documents.

You no longer have to spend your valuable time hunting down files. Our new *File-Finder* searches through the actual text of *all* your Professional Write files to find any words or phrase, and will call up the appropriate document. We'll also give you sorted lists of files, and the option to identify your files with summary descriptions.

There's more to our feature story.

We know what managers need from a word processor. That's why Professional Write offers speed keys, macros, and column-move. An integrated spelling checker,



We're quick to polish up your image.

thesaurus, on-screen calculator and address book are only a keystroke away. We also support all the popular networks.

**Put time on your side.
Call 1-408-848-4391,
Operator #60
for a free trial disk.**

PFS: Professional Write and PFS: Write owners Call 1-303-799-4900 for upgrade information.

SPC SOFTWARE PUBLISHING CORPORATION

The designers of PFS.

Introducing Close-Up/LAN the remote that lets you control all PCs on your network

Close-Up*/LAN brings you a level of control never before possible. It connects PCs on your network giving you the versatility to instantly share screens and keyboards. With one PC, or simultaneously with all PCs up and down your network. Close-Up/LAN lets people work together.

Helping people

You're sitting at your PC on the 3rd floor working on a spreadsheet budget. Suddenly, a message appears on your screen: "Bob requests help". You press a hot key, and like magic you are looking at Bob's screen. Without moving an inch you see that Bob is working on the company database. A dialog window appears and Bob explains his problem. Since your keyboard is active you instantly solve the problem, on Bob's computer.

With another hot key you decide to look in on Sue's computer screen. She's new and you need to keep an eye on her work. You see that she is working on a letter using a word-processor. You monitor her for awhile without interfering with her work. In fact, Sue doesn't even know you're there!

Hot key again and off you go on your rounds of the company. Viewing one screen after another, helping some, watching others. All from the comfort of your chair. Finished, you hot key back to your spreadsheet and carry on with your budget. Amazed, you think that support has never been this easy before.

Workgroup Conferencing

As a workgroup problem solving tool, Close-Up/LAN is unsurpassed! Close-Up/LAN lets everyone in your workgroup work as a team. Your associates can chat in a conference, all linked together on screen, no matter how distant the locations. Bring up a spreadsheet, for example, and show your sales projections for all to see. With live keyboards and an instant screen

to screen connection, associates can adjust your figures (optionally at your discretion) for what-if scenarios.

On-Network Meetings?

Close-Up/LAN lets you conference your people over a single network, over bridged networks, or between networks thousands of miles apart.

Only one program lets you have your meetings on your network, Close-Up/LAN.

Distributed Processing

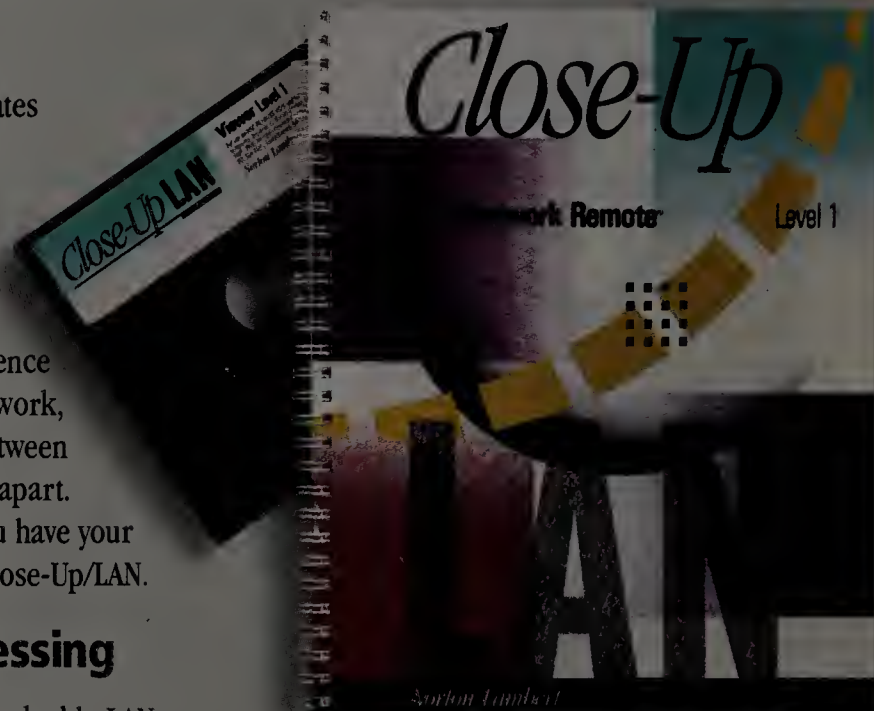
Close-Up/LAN distributes valuable LAN resources to all PCs on your network.

No matter where your PC is located you can access resources such as high speed processors (386's), CD ROM's, plotters, Irma type connections to mainframes, and modem equipped PCs that are connected to your LAN.

It's simple to think of ways to save money with Close-Up/LAN. Attach an inexpensive PC with a modem to your network. Instantly you have a shared communications server. Everyone on the LAN has access to that PC and modem, to run communication programs, terminal emulators, etc. Saving on modem and phone line costs.

Access is only a keystroke away. While working at your word processor, you decide to run a CPU intensive job on a 386 computer located somewhere on your network. Hot key to the 386 and control it as if it were your own. Close-Up/LAN connects your keyboard and screen to the 386. Start your CPU intensive job (like re-indexing a database). Then, hot key back to your wordprocessor. Toggle back, and you can view the 386.

Think of it. You can give everyone on your network the power of all peripherals at a fraction of the cost.



Training & Teaching

Close-Up/LAN lets your students watch on their PCs while you solve problems on your PC. Ideal for corporate and university classrooms. You can then reverse the process. Students work at their own pace while you, at the touch of a key, hop from screen to screen, monitoring their work.

There is only one program that fulfills the promise of your LAN's connectivity. Bringing people and PCs together . . . Close-Up/LAN.

Close-Up LAN

Call: 805/964-6767

*Norton-Lambert**
P.O. Box 4085, Santa Barbara, CA 93140 USA
Telex 709170

To Sue, Perchance to Win

But we lose when software companies go to court.

How can we best be heard?



David
Bunnell

Remember Adam Osborne? He's the fellow who marketed a low-cost and notably improved version of *1-2-3* a few years ago through his Paperback Software Company. That good idea landed him a sizable lawsuit from Lotus, charging that his program violated *1-2-3*'s "look and feel."

The Lotus suit, which created an uproar, was filed over two years ago. I ran into Adam recently, and guess what? He was busily preparing for the second round of depositions in his case. The trial date had not been set, and the lawyers were busily working away on the reams of documents needed for the legal labyrinth that lies ahead.

Since the suit was filed, Paperback has had a tough row to hoe. It has lost market share, laid off employees, and virtually disappeared from the industry. Whatever the outcome, Lotus's effort to quash Paperback demonstrates that big companies can use legal tactics to protect themselves and hinder the little guys, and in the process slow down the pace of innovation in the market.

You have to wonder, then, about the motives behind the suit Ashton-Tate recently filed against *dBASE* clone makers Fox Software and the Santa Cruz Operation, which sells the

UNIX version of *Foxbase*. *Foxbase*, which is significantly faster and cheaper than the original *dBASE*, has been on the market for over two years. How come Ashton-Tate took so long to be bothered?

When asked this question recently, Ashton-Tate president Ed Esber reportedly said, "If you robbed us two years ago or if you robbed us yesterday, it's the same thing." True enough, but Ashton-Tate's delayed response would seem to weaken its case. Besides, doesn't it make you wonder if Ashton-Tate is just trying to warn up-and-coming enterprises to stay off its turf? Of course, the suit will send a chilly wind through the whole software industry, as well as lessen the pressure on Ashton-Tate to produce better data base products. PC users lose both ways.

It amazes me that Ashton-Tate doesn't see that *Foxbase* and other data base programs have helped to make the *dBASE* language the clear standard. They have put Ashton-Tate in the driver's seat because it is by far the biggest publisher of *dBASE*. All Ashton-Tate has to
(continues)

FINALLY!

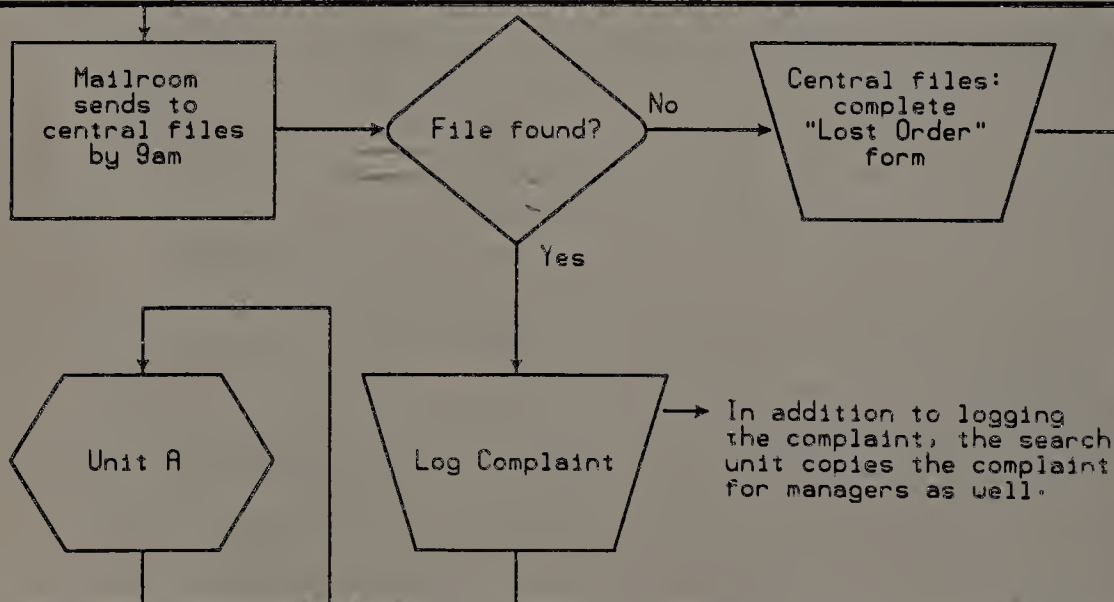
EASYFLOW

An on-screen flowchart processor that knows about flowcharts - not just another "screen draw" program that makes you do most of the work. *EASYFLOW* is a powerful full-screen graphics program dedicated to flowcharts and organization charts. With it you can quickly compose charts. More important, you can easily modify charts so they are always up to date.

- ▶ **Automatic:** Fully automatic text centering within shapes, both horizontally and vertically. Fully automatic line routing & re-routing.
- ▶ **Fast:** Written in assembly language for speed.
- ▶ **Large:** Charts up to 417 columns wide by 225 lines high. Chart too large for your printer? *EASYFLOW* automatically breaks the chart up & prints it in page size pieces.
- ▶ **Standard:** All standard flowcharting shapes included. Custom shapes can be ordered.
- ▶ **User friendly:** Don't take our word for it. PC Magazine says "*EASYFLOW* lives up to its name. It's hard to imagine any easier and more flexible way to produce basic and even complex flowcharts". [March 10th 1987 issue, page 278.]
- ▶ **Mouse:** Optional but fully supported.
- ▶ **It prints:** On most popular matrix printers including IBM, Epson, Toshiba, HP LaserJet, LaserJet-Plus and many others.
- ▶ **It plots:** On HP7440, 7475, 7550, 7570, 7585B and compatible plotters.
- ▶ **It works:** We are contractually prevented from mentioning the name of the "big eight" accounting firm that purchased a world-wide site license, but we can tell you that they spent months evaluating all available flowcharting packages before choosing *EASYFLOW*.
- ▶ **Rush delivery:** Order by noon today (eastern time) and you'll have it tomorrow. Rush delivery charge is \$10.50 (instead of \$2.00) and is available only to continental USA and Canada.
- ▶ **Documented:** 100 page manual plus over 150 screens of context sensitive help.

EASYFLOW works on IBM PC's, IBM PS/2 and compatibles. Requires 384 K memory, DOS 2.0 or higher and an IBM CGA/EGA/VGA or Hercules monochrome compatible adapter card.

Order direct for only **\$149.95** + \$2.00 S&H (USA/Canada), \$10.00 (foreign). Payment by M.O., cheque, VISA, Mastercard or Company PO.



The chart fragment above was produced on an HP LaserJet-Plus and is actual size and unretouched. Publication quality charts like this can be produced using only minutes of preparation time and seconds of print time.

HavenTree Software Limited
PO Box 1093-M
Thousand Island Park, NY 13692

Order Desk: 1-800-267-0668
Information: (613) 544-6035 ext 47
Telefax(G3): (613) 544-9632

do to compete effectively is push the standard ahead with more innovative improvements.

IBM has learned this lesson the hard way over time. By trying to force would-be PS/2 clone makers to pay royalties, it has lost what was once a clear leadership position. Nowadays, in an effort to regain that position, Big Old Blue is practically begging manufacturers to make PS/2 clones.

Complicated, drawn-out lawsuits result in huge fees and encourage a proliferation of similar suits. Of course the only clear-cut winners in this sort of legal battle are the lawyers. If *Fox-base* sales dry up as a result of Ashton-Tate's suit, we are encouraging more legal battles. What can users do about this? For one thing, by continuing to buy quality clones (both software and hardware), we can refuse to be intimidated by lawsuits. The thousands of people who belong to *dBASE* user groups could pressure Ashton-Tate to drop its suit and put more resources into product innovation. They might even create legal defense funds to help Fox Software.

It's my hope that if enough people see that their own best interests are threatened by Ashton-Tate's lawsuit and respond accordingly, Ashton-Tate will feel the chilling effect back in its own corridors. Ultimately we have to decide whether our broad needs as PC users are more important than the narrower interests of self-serving companies that want our business. I don't think there's any contest. ●

HP LaserJet Series II



Acer LP-76



- ☐ Fully compatible with Acer LP-76 resident and soft fonts.

a a a a a a a a

- ☐ 21 Acer equivalent font cartridges
- ☐ A wide range of software compatibility, including the most popular software packages.



- ☐ Fully compatible with HP Series II resident and soft fonts.

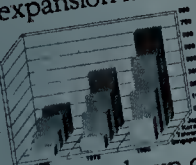
a a a a a a a a

- ☐ 21 HP equivalent font cartridges
- ☐ A wide range of software compatibility, including the most popular software packages.



- ☐ 512K of standard memory, with 1, 2 and 4MB expansion memory modules.

- ☐ 300 DPI graphics

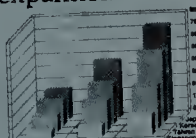


- ☐ Face-up and face-down output capability



- ☐ 512K of standard memory, with 1, 2 and 4MB expansion memory modules.

- ☐ 300 DPI graphics



- ☐ Face-up and face-down output capability

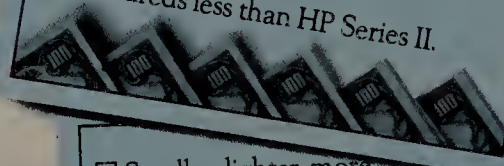


- ☐ Optional HPGL emulation for Vector graphics.



- ☐ 20% faster than HP Series II.

- ☐ Hundreds less than HP Series II.



- ☐ Smaller, lighter, more reliable design.

- ☐ Universal paper tray.

- ☐ Comprehensive hot-line support.

(800)-777-5277

Here's where the similarity ends.

- ☐ On-site service and support—nationwide.



We didn't set out just to duplicate the industry standard. We set out to raise it.

That's why the Acer LP-76™ Laser Printer has a whole series of features that surpasses those found on the HP LaserJet Series II™.

Like 20% faster output. To cut hours off project printing time. Lower operating costs. To save hundreds of dollars over the life of the printer. A smaller, lightweight package. Ideal for office environments. Acer also offers comprehensive hot-line support for fast answers to even the most technical questions.

Plus, complete on-site* service and support—nationwide from TRW.™ To help keep you on-line at all times.

Best of all, Acer delivers all these extras for a significantly lower retail price.

To find out more about our truly HP-compatible LP-76 laser printer, call: (800) 538-1542, Ext.768. In California, (800) 782-1155, Ext.768.

Acer



The Word for Value

Acer Technologies Corp.

401 Charcot Avenue,
San Jose, CA 95131
(408) 922-0333

Canada: Acer Technologies Corp. Tel.: (416) 674-2211

Japan: Acer Japan Corp. Tel.: (03) 865-0191 2

W. Germany: Acer Computer GmbH Tel.: (0211) 6508-0

Taiwan: Acer Inc. Tel.: (02) 713-2252

© 1988, Acer Technologies Corp.

Acer LP-76 is a trademark of Acer Technologies.

HP LaserJet Series II is a trademark of Hewlett-Packard.

*Comprehensive service and support available from TRW and Authorized Acer Service Centers. On-site service available within 100 miles of TRW service centers.

Circle 3 on reader service card

3½ INCH 1.4 MB DISKS FOR ONLY ONE DOLLAR!

New Invention Makes It Possible!

Do you use the new, high capacity, 3½ inch disks? If so, you have paid four, five, even six dollars per disk! Byte for byte, that is as much as SIX TIMES the 'old' 360K floppies. Now you can convert all your programs, data, and files to the new format, WITHOUT PAYING THESE PRICES!

HOW IS THIS POSSIBLE? Have you ever tried to format a regular, 'low density' 3½ inch disk to 1.44 MB? Of course you have! It doesn't work! The computer gives an invalid media error. Our company was putting in a large network of IBM Clones. We have grown from a small company to a million-dollar corporation in two short years, and we didn't do it by wasting money. So, of course, we tried to use the cheap, 720K disks. Total failure.

ENTER OUR CRACKPOT ENGINEER. Our Crackpot Engineer wondered what was the difference between the disks. He tore them apart, analyzed the media. He found NO DIFFERENCE WHATSOEVER! Yet, they would not format. Why? Then he started examining the plastic housing. And he found the difference. It is NOT in the media, IT IS IN THE PLASTIC CASE!

TOTAL FAILURE! Our Crackpot Engineer (among other things, he invented the Electronic Flea Collar) sent a brand-new 720K disk to our machine shop, and asked them to modify it. They did... and the DISK IMMEDIATELY FORMATTED! But, within 10 minutes of use, it totally failed. It lost data all over the place. Back to the drawing board. The disk was dis-assembled and examined. It was found that, in performing the conversion, a microscopic piece of plastic had entered the housing, and totally ruined the disk. It was obvious that, if the conversion could be done reliably, it required extreme precision.

ENTER OUR OTHER CRACKPOT ENGINEER. Our president is a mechanical engineer. One of the best in the country. While a research scientist at Colorado School of Mines, he completely revolutionized the field of water jet drilling. He tackled the problem. Finally he came up with a solution - a precision tool which could perform the modification EVERY TIME and leave no plastic particles which would damage the disk!

MONTHS OF TESTING. We then commenced on a testing program. We modified and formatted thousands of disks, and tested them for data integrity. Out of one thousand disks, one would not format, two had one bad track. NOT ONE LOST ANY DATA! We then put a disk on a computer with a bat file which copied data to a disk, read and checked every byte, then copied the data back to the disk. The program ran 24 hours a day, for TWO SOLID WEEKS without even one error! We were finally convinced that the procedure was reliable enough for a product.

OUR OFFER. Here is our irresistible offer. Purchase our DoubleDisk Converter for the price of \$39.95. If you are not COMPLETELY SATISFIED, return the DoubleDisk. You will receive a FULL REFUND! What is more, if a disk ever does not convert properly, send us the disk, and we will send you a 1.44MB disk from a major manufacturer in exchange!

YOU CAN'T LOSE! You will save MORE THAN THE PURCHASE PRICE IN CONVERTING ONLY YOUR FIRST TEN DISKS! From that point on, it is all profit. After converting only 100 disks, and after deducting the cost of the DoubleDisk, you will have saved AT LEAST \$425.00! Quite a return for an investment of only \$39.95!

CREDIT CARDS AND CHECKS ACCEPTED! Purchasing our DoubleDisk is easy! Simply call our 800 number. We accept all major credit cards. Or, return the coupon below, and we will ship you one immediately. We Will gladly accept your personal check.

24 HOURS **ORDER TOLL FREE — 1-800-537-4226** 7 DAYS
(In Colorado call 303-872-8945)

YES! I want to try your DoubleDisk on your UNCONDITIONAL MONEY BACK GUARANTEE! I enclose only \$39.95 plus \$3.50 Shipping and Handling (California residents add \$2.40 Sales Tax) for each DoubleDisk Converter. If I am not COMPLETELY SATISFIED, I will return the DoubleDisk for a FULL REFUND! If any disk ever fails to convert, I will send it to you and you will IMMEDIATELY send me a 1.44MB Disk in exchange!

Name _____ Address _____
City _____ State _____ Zip _____ Telephone _____

Send To: Biological Engineering, Inc., DoubleDisk Offer
2674 Main Street, Ventura, CA 93003 Phone 805-644-1797

Circle 30 on reader service card

Next
in

PC WORLD

April

Languages Special Report

Our magazine-within-a-magazine series continues with this in-depth look at tools for programmers and developers. Whether you speak C, BASIC, or Pascal, you'll find a review or tip to make you a better programmer—plus a special feature on object-oriented programming.

Affordable 386s

The stratospheric performance of 16-MHz 80386-based computers now has a down-to-earth price tag. Best of all, these systems are poised to launch the next generation of OS/2 applications without forcing you to make any compromises. *PC World* reviews ten of the most popular units.

All the Software You'll Ever Need

Who says you can't have it all? Four inexpensive packages promise a seamless blend of word processing, data management, communications, and more. Integrated software isn't for everyone, but laptop toters and casual PC users may find it's just the ticket.

TELL ME MORE!

FREE information on the products featured or advertised in *PC World* can be requested using the postage-paid Reader Service Card found in this issue.

PC WORLD

Aw...What the Heck!

EXTREMELY POWERFUL

DesignCAD 3-D version 2.0 is as powerful as most CAD systems costing \$5000 - \$10,000! Features like: Complex Extrusions-linear, scalar, and circular, Blending of Surfaces, Shading, Cross Sectioning, Complex Sweeps and Translations, and Boolean operations make DesignCAD 3-D one of the most powerful 3-D CAD systems available... at any price! Engineers, Architects and Consultants constantly tell us that they use CAD systems costing thousands of dollars which are not as powerful as DesignCAD 3-D.

VERY EASY TO USE

Just because DesignCAD 3-D is powerful doesn't mean it is difficult to use. Single keystroke commands and side-bar menus which give short directions on how to proceed make DesignCAD 3-D a snap to use! While not required, DesignCAD 3-D supports all popular digitizers and mice.

Many of the older, more cumbersome CAD systems require weeks of training before a user can be productive. DesignCAD 3-D users find they can be producing useful drawings in a matter of minutes! In a recent CAD contest only one contestant was able to match our drawing time. The package sold for \$3000.00. The other CAD packages took up to twice as long to perform the same drawing and cost up to \$5000.00!

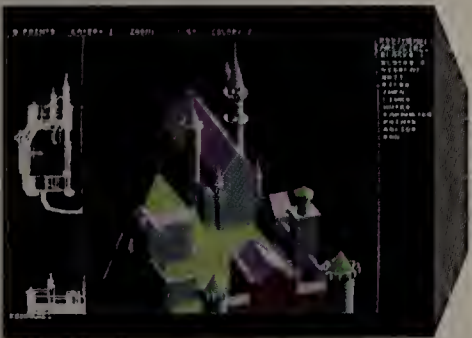
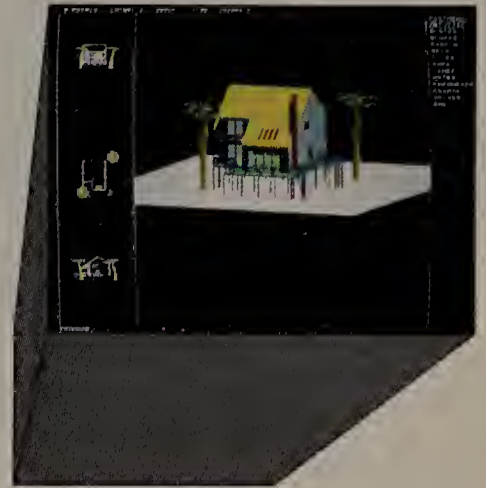
Still don't believe us? The goblet pictured below required only 16 keystrokes and 3 commands to create! The top, front, side, and isometric views were created simultaneously... in less than one minute!

VERY LOW PRICED

The first question asked by many people is, "Why is DesignCAD 3-D priced so low?" The answer? After developing DesignCAD 3-D version 2.0, we were unable to decide how the product should be priced. We consulted experts. We used the finest spreadsheets on the market. We took employee polls. Finally, in the great American Tradition, we said, "Aw... What the Heck! Let's see the other guys beat this price!" DesignCAD 3-D version 2.0 sells for \$399.

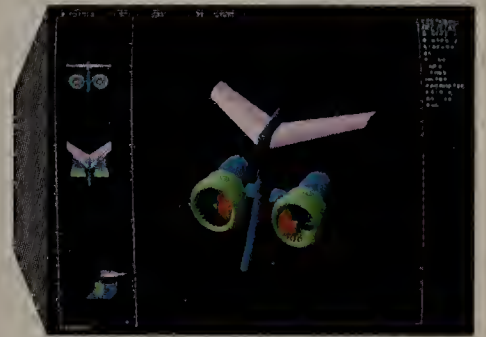


DesignCAD 3-D only \$399!



WHY BUY THIS ONE?

There is a very important reason to buy DesignCAD 3-D. PERFORMANCE. No other CAD system can match our price/performance ratio. Many people make the serious mistake of thinking that it is necessary to spend thousands of dollars to obtain "a good 3-D CAD system." This is not true! We talk to people everyday that are sadly disappointed with their "expensive" CAD systems. Don't be one of them! Call us and we will send you a complete set of literature and a free slide show demo disk. Once you compare DesignCAD 3-D version 2.0 with other CAD systems we know you will choose DesignCAD 3-D.



DON'T TAKE OUR WORD FOR IT

Here is what other people have to say about DesignCAD 3-D:

"After you've worked with DesignCAD, the single keystroke commands are simple to remember and it becomes easy to "flick one key" to execute a command. An extremely ergonomically designed program."

HENRY LEVET, Levet & Daigle Architects - New Orleans, LA
Designed a 65,000 sq. ft. nursing home using DesignCAD

"Recently I worked with a firm that builds decks. They purchased your product on my recommendation. I sat down with them and in two hours they were very proficient in DesignCAD. Now they are more effective; and we can communicate... it's wonderful to be able to do a block repeat 42 times and there are 42 2x4's to make the deck!"

J. TURNER, Architect, TAO Ltd. - The Woodlands, Texas

"Allows scientists and engineers to expend minimum time learning and using CAD software so that their time can be expended on the project at hand. It also allows scientists and engineers to quickly present to management all views of a subject. (3-D)."

DR. STEVENS, NASA Space Scientist/Engineer

HOW DO I GET ONE?

DesignCAD 3-D version 2.0 is available from most retail computer stores, or you may order directly from us. DesignCAD 3-D is available in a number of foreign languages from distributors throughout the world. All you need to run DesignCAD 3-D is an IBM PC Compatible and 640K RAM. DesignCAD 3-D supports most graphics cards, printers, plotters and digitizers. Free information and a demo diskette are available by contacting us at:

American
Small Business Computers, Inc.

327 South Mill Street
Pryor, OK 74361
918/825-4844

FAX: 01-918-825-6359
TELEX: 9102400302

Circle 306 on reader service card



THERE'S A FAX ON YOUR DESK.

ADD THE COMPLETE FAX/9600 TO YOUR PC FOR JUST \$699. The Complete FAX/9600™ lets you communicate with any Group III fax machine in the world. Even with other computers equipped with a fax board. You can send text, graphics, hard copy, just about anything you use in your business.

EASY TO USE. With our Hot Key, you can send directly from your word processing program with just a few quick keystrokes.

OPERATES IN THE BACKGROUND. The Complete FAX/9600 sends and receives faxes transparently, without interrupting the program you're working on.

When a fax comes in, you can view it immediately, save it, or print it out while you continue to work.

SEND TO ANYONE, ANYTIME. There's a directory for frequently dialed numbers you can use to create different distribution groups. With one command, you can send a fax to each destination along with an automatically generated cover sheet.

You can store faxes and schedule them for transmission later, when phone rates are

lower. To make sure a busy phone line doesn't get in the way of delivery, automatic redial keeps trying until your fax gets through.

COMPLETE SCANNER SUPPORT. The Complete FAX/9600 supports all popular scanners, including Canon®, DEST™, Microtek and Hewlett-Packard. It comes on one easy-to-install board that takes up a single slot. It even comes with a 2-year warranty.

WHAT YOU NEED. Just an IBM® PC or compatible with a hard disk and graphics card. With that and \$699, you're in business.

There's also an optional on-board 2400 bps Hayes®-compatible data modem available.

And if you want a 4800 bps fax, ask for The Complete FAX™. It comes with a long list of features for just \$399.

For more information about The Complete FAX/9600 or The Complete FAX and the name of the dealer nearest you, call today.

1-800-634-5558.



TheComplete PC

521 Cottonwood Drive, Milpitas, CA 95035, (408) 434-0145 FAX (408) 434-1048

© 1988 The Complete PC. The Complete PC, The Complete FAX, and The Complete FAX/9600 are trademarks of The Complete PC, Inc. All other names are trademarks or registered trademarks of their respective companies.

Circle 44 on reader service card

A New Kind of Home Computer

What happens when The Manhole meets The PC?

With advanced CD ROM technology, high-end applications stoop to conquer the low-end home entertainment market.

You probably haven't heard of *The Manhole*. That's because it's a Macintosh entertainment program. It runs on top of *HyperCard*, the so-called construction-set software that comes with every new Macintosh. And it comes on five 800K floppy disks and requires a hard disk (by the time you read this, it should be available on CD ROM). Not the kind of product the average reader of *PC World* would spend a lot of time thinking about.

But it is the kind of product you should at least be aware of, because it forecasts exciting developments in the PC-compatible-computer business. Those developments will probably be based on a new computer-oriented compact disk format called CD ROM XA, which stands for compact disk read-only memory, extended architecture (and is one of the finest examples of acronymic excess to be found in the computer business). CD ROM XA extends the basic way that read-only compact disks can be designed into personal computers.

Previously, computer designers thought of CD ROM drives as devices that could read data from a 520MB disk. What if maintenance manuals for Boeing 747s, the historical record of stock prices for hundreds of pub-

licly held companies, or even, gasp, every single telephone number in the entire country could fit on a single disk? Such CD ROM disks have actually been produced (with the exception, so far, of the telephone directory, given the vicissitudes of deregulation), to the great delight of Boeing 747 maintenance people and certain financial analysts.

Some designers, bored at the prospect of these disks simply holding tons of tedious data, decided to find a more interesting way to put CD ROMs to use: CD-I. Compact disk interactive is essentially a computer in the guise of a consumer-electronics device, one that looks remarkably like an audio compact disk player with a few extra buttons. Indeed, CD-I devices (which are still in prototype, nearly three years after the initial announcement) contain such computerlike components as a modified Motorola 68000 processor, a new version of Microware's multitasking OS/9 operating system, 1MB of RAM, a serial port for printers or other peripherals, plus colorful, high-resolution graphics and compact disk-quality audio.

(continues)



Stewart
Alsop

The CD-I innovators (working for Sony and for N.V. Philips, the Dutch consumer electronics company that invented compact disks) envisioned interactive applications where users could wander through simulated worlds, explore talking encyclopedias, and enjoy games with hundreds of scenarios, all controlled with a joystick or a mouse.

Computer designers woke up to CD-I as soon as it was announced and decided (rightly or wrongly) that this new device posed serious competition to computer manufacturers (a group that does not include Philips or Sony, notwithstanding Sony's attempts to enter the computer market). So after two years of intense negotiations and

back-room politicking, most of CD-I's main elements—including the crucial audio and graphics features—have been separated from a specific processor and operating system and freed up to be implemented on any old personal computer. This is CD ROM XA.

Now, of course, some manufacturer has to decide to integrate CD ROM XA into a personal computer (several are rumored to be doing just that, including both IBM and Sony). But it would be hard to imagine what you might do with a computer equipped in this fashion, if it weren't for Apple Computer.

Apple has provided the computer industry with a great demonstration system for the possibilities of CD ROM XA, including a Macintosh with high-

resolution black-and-white graphics; an integrated sound processor; an optional CD ROM drive; and a standard, mostly object-oriented development system in *HyperCard*. The upshot of having this demonstration system around is an innovative piece of software, *The Manhole*, the first interactive simulation that even comes close to approximating what might be possible with a computer that integrates optical storage, color graphics, and sound.

The Manhole is a world created completely in the minds of its developers, using references from children's literature. In this world, where you navigate solely
(continues)

**You'll never get a second chance to . . .
Make a Good First Impression!**

Honorable *Elegant* Authority Professional
TRUSTWORTHY Fortright *Opulent* Shy
Reberent Hardworking *Open* Traditional
Patriotic **Uptown** Distinguished *Personal*
Creative Congenial **Assertive** *Ερθδιτε*

DIGI-FONTS' affordable, scalable typefaces for HP LaserJet Plus, II and compatible printers. Make your own bitmap fonts in any size you want, in one tenth of a point increments.

Choose a typestyle that says it for you!

Basic Set \$69.95 *plus shipping*
8 typefaces & *Digi-Duit!* program (essential for DIGI-FONTS)
Reference manual, Typeface catalog

Typeface Library \$349.95 *plus shipping*
264 additional typefaces

Order Today!
(800) 242-5665

DIGI-FONTS, INC.
3000 Youngfield Street, Ste. 285
Lakewood, CO 80215 (303) 233-8113

This ad set entirely with DIGI-FONTS' Typefaces.

Circle 304 on reader service card

TELL ME MORE!

FREE information on the products featured or advertised in *PC World* can be requested using the postage-paid Reader Service Card found in this issue.

PC WORLD



TI's OmniLaser 2106. The laser printer for today, tomorrow, and when there is no tomorrow.

When your success depends on making great-looking documents, you need a laser printer that's versatile enough to handle just about anything that comes up. That printer is Texas Instruments OmniLaser™ 2106.

This quiet, six-page-per-minute laser printer comes with all the capabilities you need to produce word processing, spreadsheets and other PC applications. It also comes standard with Adobe™ PostScript®, the magic behind desktop publishing. So you get unsurpassed control over type, graphics and page composition. All from the top of your desk.

Beyond word processing.

Today, people in every pursuit are changing to desktop publishing to give their

documents an edge. With over 600 software packages supporting PostScript, TI's OmniLaser 2106 gives you the power to print today's documents and then go far beyond. Because not only does the OmniLaser emulate the HP LaserJet Plus™, it also features Adobe PostScript. So your documents look better, communicate faster and sell harder.

TI's OmniLaser 2106 with PostScript gives you excellent control over type, graphics and page composition.



Improve your standard of printing.

TI's OmniLaser 2106 gives you great graphics, text that looks typeset and paper handling features that allow you to print on envelopes, legal size and more. It also features multiple industry-standard emulations and interfaces. All easily selectable at the touch of a button.

TI's OmniLaser 2106. It's the laser printer of your future, as well as the one you need right away. The OmniLaser family also includes the 2108 small-cluster printer and the 2115 shared-resource printer. For a free brochure on how to choose a laser printer and information about TI's on-site warranty, call 1-800-527-3500.

TurboTax®

THE BEST GETS BETTER!



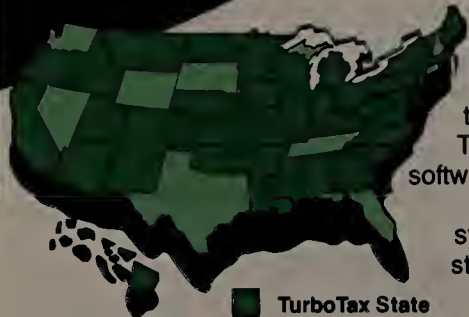
Still the Critics Choice!

"It makes doing your taxes almost fun."
—PC Magazine

"The only thing TurboTax can't do is print the money."
—PC World

"Triple Crown: form preparation, tax planning and elegantly written software."
—Money Magazine

TurboTax does states, too!!



TurboTax State

Complete the chore with TurboTax state software. TurboTax is THE ONLY system with 41 state packages available!!
Only \$40. ea.

DEPENDABLE

The #1 selling tax software continues to be the overwhelming choice of taxpayers everywhere! And with over 1,500,000 tax returns filed last year, you know you're getting software on which YOU CAN DEPEND.

Here's how TurboTax helps you this year:

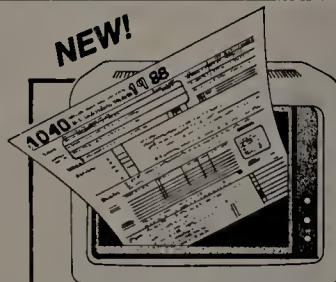
- The famous "Quick-Look Tax Window"
- NEW! • 1040A Short Form
- FAST—calculates tax return under 3 seconds
- Over 40 forms—all the forms you'll need
- On-line IRS Instructions
- Quick-Link Forms Finder—to find forms by subject
- Pop-up Calculator and Notepad
- On-line help
- NEW! • Auto-Interview—helps you select the tax forms you need
- 1989 Tax Planning included FREE!
- Data Examiner—to help pinpoint any omissions
- IRS Approved DOT MATRIX 1040 with list of printers expanded—includes Laser Jet

NEW!

PROFESSIONAL REFERRAL SERVICE

Consult a tax professional with your TurboTax data file as the starting point! Over 8,000 TurboTax ProSeries/1040 accountants now available for strategic tax planning, finishing your return or a financial tune-up. Write for the name of the TurboTax professional nearest you!

NEW!



VISUAL 1040

You have to see it to believe it!

COMING SOON!

PERSONAL FINANCE MANAGER

Complete personal finance manager with direct link to TurboTax. Checking and portfolio management. Investment Advisor. Household Inventory. Budget Analysis. And Much More! Coming first quarter 1989. Under \$100. The **only** way to count **your** beans.

STILL ONLY

\$75

SEE YOUR LOCAL DEALER. Or order direct. Shipping included (Continental US only). CA residents add 6½% tax. VISA/MC.

CREDIT CARD ORDERS CALL
1-800-782-1120 (OUTSIDE CALIFORNIA)

FREE!! While supplies last, copy of the latest Price Waterhouse Personal Tax Advisor included with your direct order.

Inc.
5045 Shoreham Place
San Diego, CA 92122
(619)
453-8722

by clicking on graphic objects on the screen, you can wander from a room where you're welcomed by a hipster dragon, to a sunken ship where a polite, slow-moving walrus escorts you, to a tower room hosted by a rabbit drinking beer and watching TV. The world is charming, engaging, and in its floppy disk version (which must be loaded on a hard disk to be used) provides about two hours of exploration and fun.

Now put *The Manhole* together with the capabilities of a standard 286-based PC equipped with CD ROM XA for about \$1500 discounted, to be delivered next fall. And they say that personal computing isn't as interesting as it used to be. Hah! ●

Stewart Alsop is editor and publisher of P.C. Letter and a contributing editor for PC World.

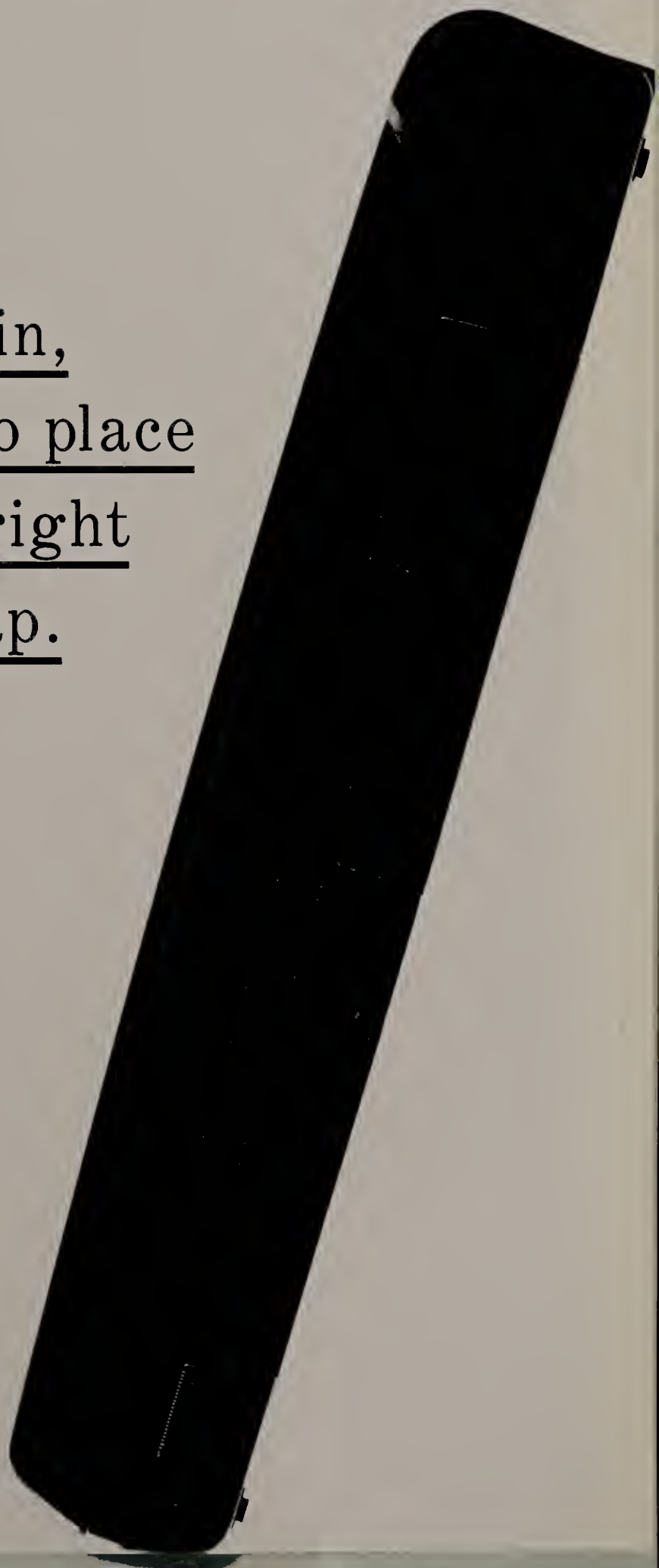
POWER TIP NO. 38

Now You See It With ProComm

With ProComm and ProComm Plus, some monochrome monitors don't display all the text or highlighting on the help screens. If missing text is a problem, try starting the program with the /B option to use ProComm's black-and-white settings. Type ProComm/B and you'll be able to see the status line and all text.

Phil James
Director of technical support
Datastorm Technologies

Once again,
we're about to place
the future right
in your lap.



LOW BATT

Esc F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12

1 2 3 4 5 6 7 8 9 0 _ + Back Space

Tab Q W E R T Y U I O P { } | \

Caps Lock A S D F G H J K L ; ' " , . /

Shift Z X C V B N M , > ?

Ctrl Alt

Navigation keys: arrow keys, Home, End, Page Up, Page Down

NEC
UltraLite

At NEC, we've seen the future. And it measures precisely 8.3" x 11.75" x 1.4". Introducing the UltraLite.[™] The lightest, thinnest, full-function laptop computer. Weighing in at 4.4 lbs., it boldly goes where no laptop has gone before: right in your briefcase.

Of course, the true measure of a laptop is not just its width and length. Equally important is its depth.

With a 10MHz NEC V-30 processor, the UltraLite has 90% of the power of the original IBM AT. Plus a main memory of 640K, a full-size industry standard keyboard, and built-in Microsoft DOS Manager and Lap-Link software. It also has a large, bright backlit screen that supports both text and graphics.

For storage, it has an innovative one or two megabyte silicon hard disk, which provides access to data several times faster than a conventional hard disk.

And what's more, there's also a slot for NEC's unique high-speed ROM cards which give you the opportunity to increase your storage capacity. Each ROM card contains a popular software program, yet it's about the size of a credit card.

Impressed? So was *PC Magazine*, which just named the UltraLite "Portable Computer of the Year for Technical Excellence." See your NEC dealer for a demonstration. You'll agree, when it comes to laptops, there's never been anything quite as big.

NEC UltraLite[™]

Wherever
you can
put this
magazine,
you can
now put a
computer.

Introducing the laptop computer

Problems, problems, problems.

Computers were designed to solve them.

But sometimes they've been known to cause a few of their own. Example: You just purchased a laptop. At first, every-

thing seems fine. But soon you want to expand your data base. Use more sophisticated

software. Link-up to local area networks. When you realize you can't, you begin to ask yourself: Where's the power? Where's the expandability?

Where's the receipt?

Introducing an end to all your problems. The ProSpeed™ 286, from NEC. Weighing under 15 lbs., the ProSpeed 286 is surprisingly light. But in other areas, it's a real heavyweight. Like expandability, connectivity and speed. In fact, it offers the full functionality of a high-

performance desktop. The

ProSpeed comes equipped with one megabyte of memory that's expandable to five.

And, it comes with either 20 or 40 megabyte hard disk drives. There's even an advanced model that provides a high-speed 100 megabyte drive for special applications.

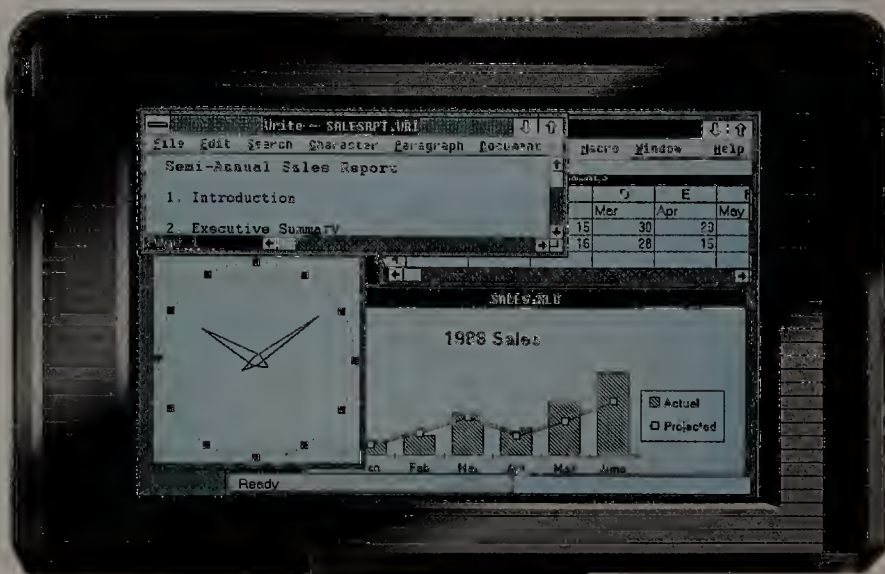
As for its display, it clears up a very serious problem: clarity. NEC's Monograph™ CTN screen gives you crisp, backlit images that provide CRT quality with VGA resolution.

For power-hungry executives, the ProSpeed 286 is powered by a CMOS 80286

processor running at 16MHz. Meaning it's fully capable of

The ProSpeed 286 screen is so clear and crisp you can even display multiple windows.

The ProSpeed 286 Expansion Station gives you the flexibility and expandability of a high-performance desktop computer.



that solves problems others can't.

The ProSpeed 286 runs at 16MHz. It's the fastest 80286 laptop around.

such as
Microsoft
Excel. And then
there's the ever-
expanding problem of



expansion, for which NEC has
developed a unique solution
called an Expansion
Station.™ It's an innovative
system that includes four stan-
dard slots, one standard
drive bay, a power supply
and permanent con-
nections for both
printer and serial devices.

*The ProSpeed 286
features a full-
function keyboard
with standard
spacing.*

Admittedly,
there's one problem we
can't solve. Whether to use
the ProSpeed 286 as a laptop
or desktop?
That's one you'll just have to
tackle yourself.

handling
the most demand-
ing DOS applications.

Not to mention OS/2 Presentation
Manager and Windows applications

DOS,
Windows
and Microsoft
Excel are reg-
istered trade-
marks of the
Microsoft Corp.
OS/2 is a trade-
mark of International
Business Machines
Corp. WordPerfect is a
registered trademark of
WordPerfect Corp. Paradox
is a registered trademark of
Borland International.
Micrografx is a trademark of
Micrografx, Inc.

NEC ProSpeed™ 286



In order to make the ultimate desktop comp

Our sincere apologies to desk makers everywhere.

But when we set out to make the ultimate desktop computer,

we knew it had to have three critical components. Awesome power. Unequaled expansion capabilities.

And most importantly—a handle.

Introducing the ProSpeed™ 386 from NEC. The first personal computer to offer the portability of a laptop and the power of an 80386 desktop.

With the ProSpeed 386, the designers at NEC did more than create a new computer. They

You've never had this much power sitting in your lap.

established a new class of computers—the first modular workstation.

To realize how this can benefit you in the future, let us remind you how it was in the past.

With ordinary laptops you had to hook and unhook peripherals, phone lines and all sorts of cables every time you left the office.

But thanks to a revolutionary Docking Station™ design, the ProSpeed 386 leaves all that behind.

You simply slide the laptop out of the Docking Station, and then slide out of your office. Leaving all your connections connected for when you return.

And saving yourself



Snap the ProSpeed 386 into the Docking Station, and it's a desktop. Snap it out and it's a laptop.



ter, we had to remove one major obstacle.

one of the most precious commodities of all—time.

Most importantly, the Docking Station can accommodate a full range of expansion options; it has four full-size card slots, and two standard drive bays for tape back-up, CD-ROM or 5¼" floppies.

Take away the Docking Station and what have you got? One of the world's most powerful laptops.

Running at 16MHz, it offers two megabytes of 32-bit memory that's expandable to 10.

It's equipped with a hard disk and is available with either 40 megabytes or 100 megabytes of storage capacity.

As for its 10½" diagonal black-on-white display, it's positively brilliant.

Advanced screen technology delivers a paper-white image and EGA resolution.

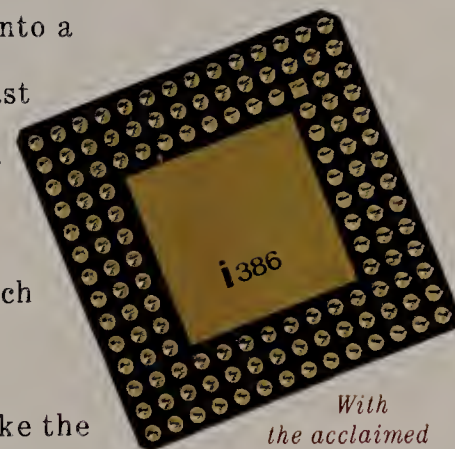
In more ways than one. NEC's advanced screen technology, called Monograph™ CTN, provides CRT-quality video with a paper-white image and EGA resolution.

Which translates into a higher level of contrast and increased resolution for graphics-oriented programs, such as Windows.

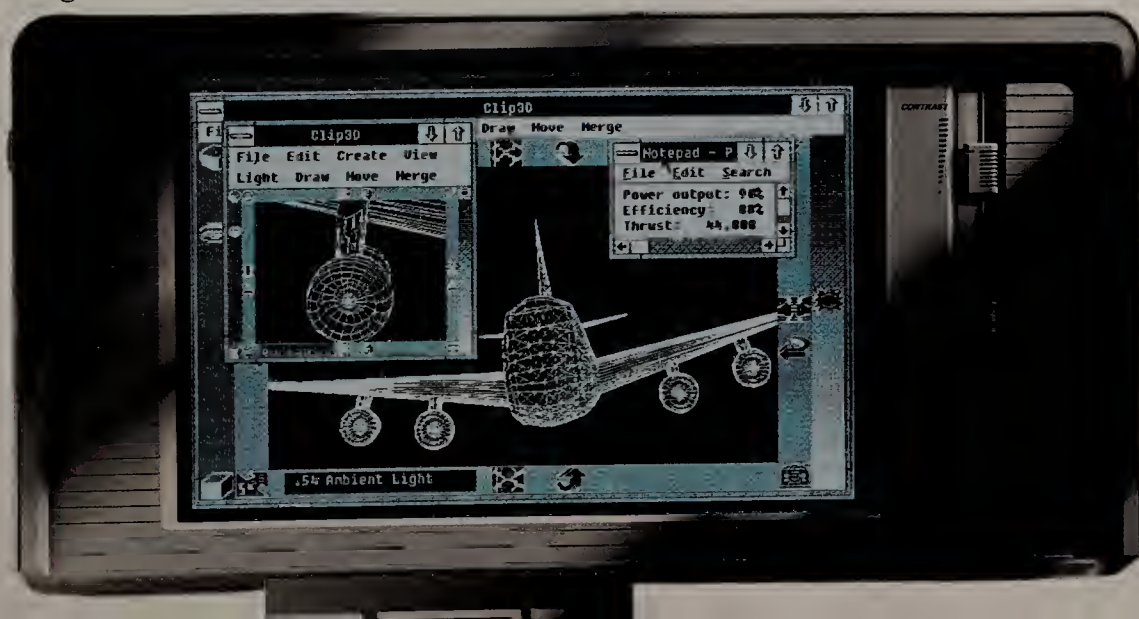
Which helps to make the ProSpeed 386 not just the ultimate desktop, but the ultimate value. Whether your

desk has four legs or just two.

NEC ProSpeed™ 386



With the acclaimed 386 chip, ProSpeed delivers exceptional speed and full multi-tasking capabilities.



For a closer look at the future, see your NEC dealer. For product literature, call 1-800-826-2255.

For technical details, call NEC Home Electronics (USA) Inc. at 1-800-FONE-NEC.

*ProSpeed™ 386.
40 or 100 megabyte
modular workstation with
all the power of an
80386 desktop.*

*MultiSpeed™ HD.
Lightweight 20
megabyte laptop.*

*ProSpeed™ 286.
The fastest
80286 laptop.*

*UltraLite™
The lightest, thinnest,
full-function laptop.*

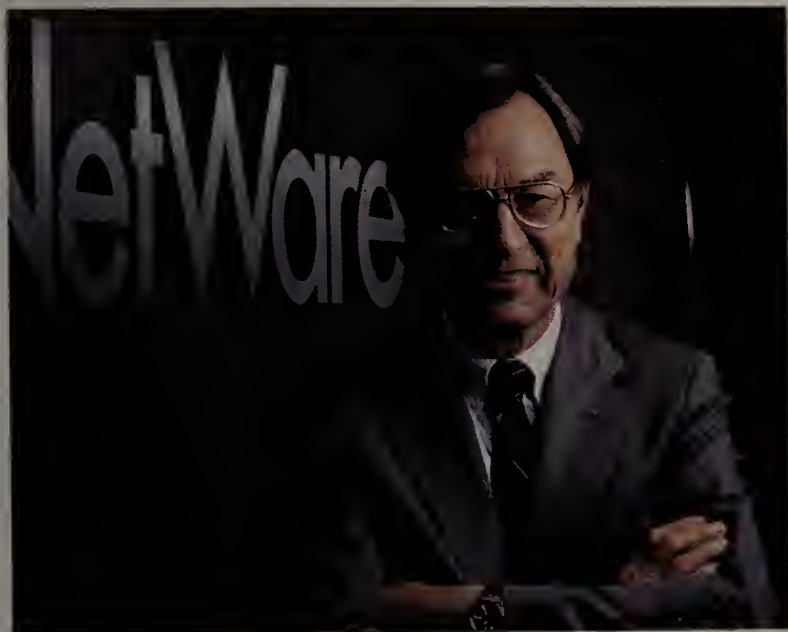
©1989 NEC Home Electronics (USA) Inc.

Edited by ERIC BENDER

Multivendor Support Broadens

Novell Focuses on Network Software

Aims to Simplify Operations



The biggest challenge, says Ray Noorda, will be to deliver on Novell's far-flung product promises.

How fast has Novell grown? This year, the network specialist is likely to sell more PC software than Ashton-Tate.

While the sheer diversity and complexity of the never-ending *NetWare* product stream might baffle and intimidate all but veteran networkers, Novell remains sharply focused on offering a coherent, open platform for network computing. *NetWare* connects more than 3 million workstations, and in six years it has carried Novell across the \$300 million sales mark.

"Novell began creating universal standards and a universal applications environment before other

companies latched on to that concept," remarks Clare Fleig, director of research at International Technology Group in Los Altos, California. For *NetWare*, that consistency has paid off in a loyal following among sophisticated resellers and application software vendors—as evidenced by more than 5000 *NetWare*-specific products. "Developers can't ignore that marketplace," adds Harry Saal, president of Network General, a network utility firm in Sunnyvale, California.

In addition to its highly lucrative software, Novell offers a broad range of net hardware. The line's profits, however, are disappointing, and Novell is actively slimming down

its offerings—taking a \$10.2 million write-down on its inventory last fall. "We're shifting to software a little faster than expected; it's about 65 percent of our business now," says Ray Noorda, Novell's softspoken 63-year-old chief executive.

But even as business booms, Novell finds itself in a war of words with other net vendors over the small OS/2 network market. The Microsoft/3Com *LAN Manager* camp claims that the ability to run the same operating system on workstations and servers will smooth the path into distributed applications.

Unlike its rival, however, *NetWare* is not optimized for OS/2; instead, the software provides network functionality and performance on a variety of servers (including, in an upcoming release, 80386 machines). It offers basic file/print services for OS/2 workstations, along with a menu of tools and hooks for building distributed applications. In addition, Novell will soon release *Nondedicated NetWare*, which lets OS/2 run on a *NetWare* server, but Noorda downplays its importance.

IBM is building its OS/2 network software around the Microsoft package, and Microsoft claims that the rapidly developing standard will exclude *NetWare*. Novell retorts that it will support IBM's key interfaces soon after they appear—as it did a few

(continues)

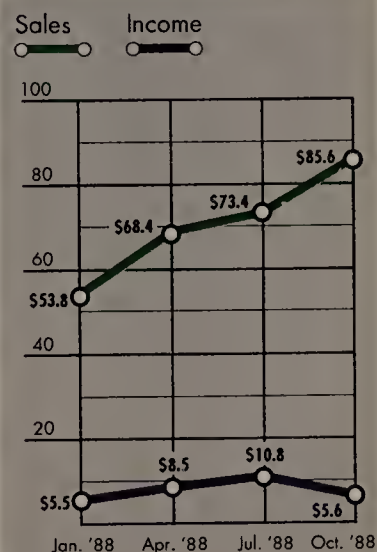
Norton Strengthens Utilities

Disk Recovery Still Central

Comedian Rich Hall defines an *ohnosecond* as that sickening moment between the time you realize that you're about to lock your keys in your car and the time the door slams.

Peter Norton has worked for the past six years to eliminate the ohnosecond from the PC world. One of the industry's first heroes, Norton (continues on page 68)

Novell Sales Rise Steadily (in millions of dollars)



Novell's sales keep climbing, although income suffered in the latest quarter as the network product supplier took a \$10.2 million write-off on hardware inventory.

Hit by VGA, Hercules Pushes Low-End Sales

Promotes Speedy RamFont Displays



Hercules has shifted toward cost-sensitive customers, says Andrew Fischer.

Started in a California garage, this company brashly ignored IBM while setting its own industry standard for sharp graphics. And it succeeded in doing just that.

But the similarity with Apple Computer ends there, because in the past two years, Hercules Computer Technology has faded from the spotlight.

During its heyday, the Berkeley, California, company dominated the market for PC add-on graphics boards. In 1982, Hercules introduced the first graphics board that enabled IBM PCs to display sharp, high-resolution graphics on monochrome monitors, and it caught on as a de facto standard.

After Hercules debuted a color card in 1984, PC

World readers preferred it to IBM's in the World Class Awards balloting. In 1986, Hercules unveiled RamFont, a hardware/software combination that enables users to display a rich mixture of text fonts and character attributes without losing the speed of text mode.

Cofounders Kevin Jenkins and Van Suwanukul, who started Hercules with just \$23,000, pushed sales to about \$70 million in 1986. Things were going so well that Jenkins retired at the ripe old age of 32. He took his family to Mexico, where he bought a boat and a beach.

But at virtually the same time that Jenkins left, IBM introduced the

(continues)

Novell

(continued)

years back with IBM's PC LAN Program, moving faster than the Microsoft licensees.

Still, Fleig sees Novell heading into a brawl in corporate networking—with IBM. "Novell is not necessarily vulnerable in 1989," she suggests, "but it's probably very vulnerable in 1990 and later, because of the shift to OS/2 Extended Edition. What IBM is doing is huge and strategic—a whole new architecture. Novell has been saying 'We can do the job better than IBM.' That will be a harder sell."

Noorda concedes that IBM will continue to be a major competitor, but he insists that the move toward large and complex corporate environments opens up new ground, especially where the ability to accept non-IBM computers like the Macintosh is concerned. "We're far more flexible than IBM," he contends.

While many see Novell and 3Com as head-to-head adversaries, Noorda says that 3Com, with its heavy concentration on hardware, is not his firm's real competition: "3Com is more a Hewlett-Packard look-alike; we look more like Microsoft and other software firms." Novell does find itself increasingly competing with another hardware vendor—Digital Equipment. Fleig and other observers also see Banyan Systems of Westboro, Massachusetts, posing an increasing threat with its Vines software, which was designed from the beginning for large corporate nets.

Novell's entry-level network contender, *NetWare ELS*, produced a surge of orders when it was introduced in 1987 and has been upgraded many times since, says Noorda. However, Saal maintains that Novell hasn't made it entry-level in all aspects. Without greater ease of use, he argues, "there's a potentially huge additional market that they're not addressing."

One reason Novell doesn't heavily target the low end of the market, Fleig notes, is that it has painstakingly built up a group of technically adept resellers. "This isn't like selling shoes; you really have to understand the technology," she remarks. But these resellers aren't keen on low-end products.

Overall, Noorda expects Novell to grow between 30 and 50 percent this year. As it becomes more entrenched in corporations, "the marketing issues are getting less complex," he says. Development becomes more critical; "our greatest vulnerability now is execution."

Running a 1500-employee firm from Provo, Utah, has its drawbacks, Noorda agrees, including difficulty in attracting management talent. Part of Novell's response is to distribute resources elsewhere—particularly Austin, Texas (home of the development tools division), and Santa Clara, California (headquarters for the connectivity division). Another part of the solution, he says, is "to simplify the company. Reducing the hardware portion is a great simplification." —E. B.

NEW from the publisher of SOLOMON III . . .

PROFITWISE™

**BASIC ACCOUNTING SOFTWARE FOR
90% OF U.S. BUSINESSES!**

ACCOUNTING
SOFTWARE
\$229.00

REAL ACCOUNTING FOR \$229.00

INTRODUCING PROFITWISE, a basic accounting software system designed to meet the accounting needs of many small businesses. Statistics show that only 10% of American businesses have sales over \$500,000 . . . PROFITWISE is real accounting for the other 90%!

PROFITWISE OFFERS WHAT NO OTHER PRODUCT OFFERS. . .

REAL ACCOUNTING Recognizing that businesses with lesser revenues need real accounting too, TLB Inc. has developed PROFITWISE, a specially adapted version of the powerful award-winning Solomon III system. PROFITWISE provides many of the features of Solomon III but limits the number of transactions it will handle. With PROFITWISE, users will pay for only the features and transaction volume they need.

UPGRADE CAPABILITIES Everything users learn with PROFITWISE applies to Solomon III. The user can easily and quickly upgrade to Solomon III at any time. There is no need to rekey information because the PROFITWISE database is compatible with Solomon III.

TRAINING available nationwide.

UNSURPASSED TELEPHONE SUPPORT!

TLB HAS THE ANSWER TO ALL YOUR
COMPUTER ACCOUNTING NEEDS. . .



FEATUREWISE . . .

■ BASIC ACCOUNTING \$229.00

General Ledger

- Extensive Annual and Periodic Budgeting capability
- User defined fiscal periods - post to any period
- Powerful report definition ability

Payroll

- Standard deductions and earnings type already set up
- Unlimited number of user defined deductions including 401K capability
- All Federal and State tables included
- Automatic W-2, 941 and state unemployment reports

Accounts Payable

- Tracks complete 1099 information
- Both past due and until due aging report formats

Accounts Receivable

- Open-item and balance forward customer accounts
- User defined terms and aging categories

Invoicing

- Automatic sales tax calculation
- Optional user-defined message on invoices
- Automatic backordering (w/inventory module)
- Service and Product Invoices

Fixed Assets Depreciation

schedules, acquisition and disposition

Address

Prints lists, labels or index cards

PROFITWISE Basic Accounting must be installed prior to these add-on modules:

■ PROFITWISE INVENTORY & JOB COSTING

Add @ \$229.00

Job Costing

- Automatic interface with Payroll and Accounts Payable modules reduces data entry
- Tracks jobs from bidding through completion

Inventory

- Automatically updates general ledger for COGS
- Automatically updated (by invoicing module)
- Average, standard or user specified cost methods

■ PROFITWISE REPORT & GRAPH DESIGNER

Add @ \$229.00

Output

- Automatic formatted reports on screen or printer
- User formatted reports with multiple level subtotal breaks and grand totals
- Transfer of information to Lotus worksheets

Hardware Requirements: All IBM PC/XT, AT, PS/2, COMPAG and 100% compatible computer PC-DOS or MS-DOS 3.1 or higher 512K RAM (576K for Report & Graph Designer). Minimum 10 megabytes of hard disk storage. Printer capable of 132 columns (normal or condensed)

EASY TO USE . . .

The PROFITWISE system features:

- Computer based tutorial that guides you through installation
- On-line help "at your fingertips"
- Up to 10 departments or company codes
- Extensive password protection ability
- Thorough audit trail of all transactions
- Full integration between modules to reduce data entry
- Reports can be output to screen or spreadsheet/word processor
- Comprehensive User Reference manual



- **CALL NOW TO ORDER!**
1-800-777-0521
- **ASK FOR PROFITWISE AT YOUR LOCAL COMPUTER STORE**
- **OR ORDER BY MAIL . . .** Add \$10.00 for shipping & handling
TLB INC
P.O. BOX 414; FINDLAY, OHIO 45839

Solomon III, Solomon Series and Profitwise are registered trademarks of TLB, Inc.
Lotus is a registered trademark of Lotus Development Corp. IBM is a registered trademark of International Business Machines Inc.

**Solomon
Series®
Software**

Nestor Aims to Achieve Neural-Net Recognition

Into the Black This Year?

After winning a Nobel Prize for superconductivity research, Leon Cooper joined another Brown University professor to create computer models of the human learning process. That work led Cooper and his partner, Charles Elbaum, to form Nestor, Inc., the leader among more than a hundred start-ups hoping to get rich on neural network technology.

Although it has not turned a profit since it in-

corporated and went public in 1983, the Providence firm is successfully building applications to solve business problems that elude traditional algorithmic or rule-based expert systems.

Michael Buffa, Nestor's president, credits Yankee frugality for the company's healthy balance sheet, which includes a 9-to-1 ratio of equity to debt. Although losses remain heavy, Buffa expects



Nestor's Leon Cooper can point to successful PC prototypes.

to stem the flow of red ink by midyear, unless the company decides to expand its 34-person staff to handle an upcoming military contract. "That may postpone profitability by

one quarter, but it's not years away, it's quarters away," Buffa says.

Nestor's first product was a character recognition system that turns letters written on a digitizing pad into machine-readable ASCII characters. Nestor is negotiating a marketing agreement with a large computer vendor, Buffa says, because it's too small to do the job itself.

The firm has also tackled speech and object recognition, process control, financial decision making, risk assessment, and forecasting. In each job, the key to success is the neural net's ability to detect (continues)

Hercules

(continued)

PS/2 and put its VGA graphics on every motherboard—eliminating the need for add-on graphics boards.

"Our largest market disappeared," admits Andrew Fischer, vice president of product development. "Early 1987 was certainly the height of our fortunes." While the company declines to reveal sales figures, Dataquest analyst Sohail Malik estimates 1987 sales at \$45 million and figures that they dropped slightly in 1988.

But Fischer insists the 80-employee company is still very profitable. That's because it continues to sell thousands of monochrome boards a month, while competitors focus on the color market.

"Color is really a nonessential," Fischer says. A business that wants to run 1-2-3 or WordPerfect with EGA or VGA color, he claims, must spend almost three times as much as it would using monochrome. "That's why monochrome will never go away," he says confidently.

Competitors chuckle at that line of reasoning, saying it shows how far behind the times Hercules has slipped. "They are long gone; we don't even see them anymore or regard them as one of our major competitors," snorts Greg Reznick, marketing vice president at Video Seven in Fremont, California. Though Hercules introduced color boards, it ignored the EGA market and failed to unveil a VGA clone until last fall—long after competitors.

"They missed the boat on the color market," according to Dataquest's

Malik, who estimates that about 40 percent of all PC displays are monochrome.

Hercules continues to offer intriguing products, like the Network Card Plus with built-in AppleTalk capability, which debuted last year. But the company's ability to set standards seems far less certain than in the free-wheeling days when Jenkins, his ever-present sunglasses, and his English bull terrier Pinkie dominated Hercules' marketing efforts.

For now, Hercules is counting on producing profits in three ways: selling even more monochrome cards for the hundreds of thousands of IBM PC compatibles consumers purchase each year, offering its inexpensive (\$299) plain-vanilla VGA board, and trying to establish RamFont.

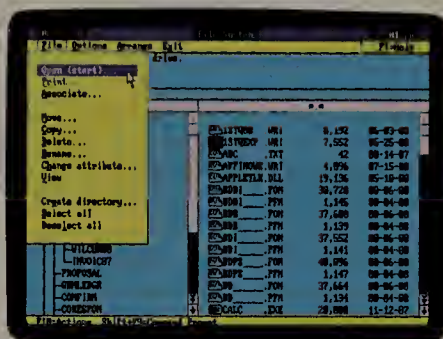
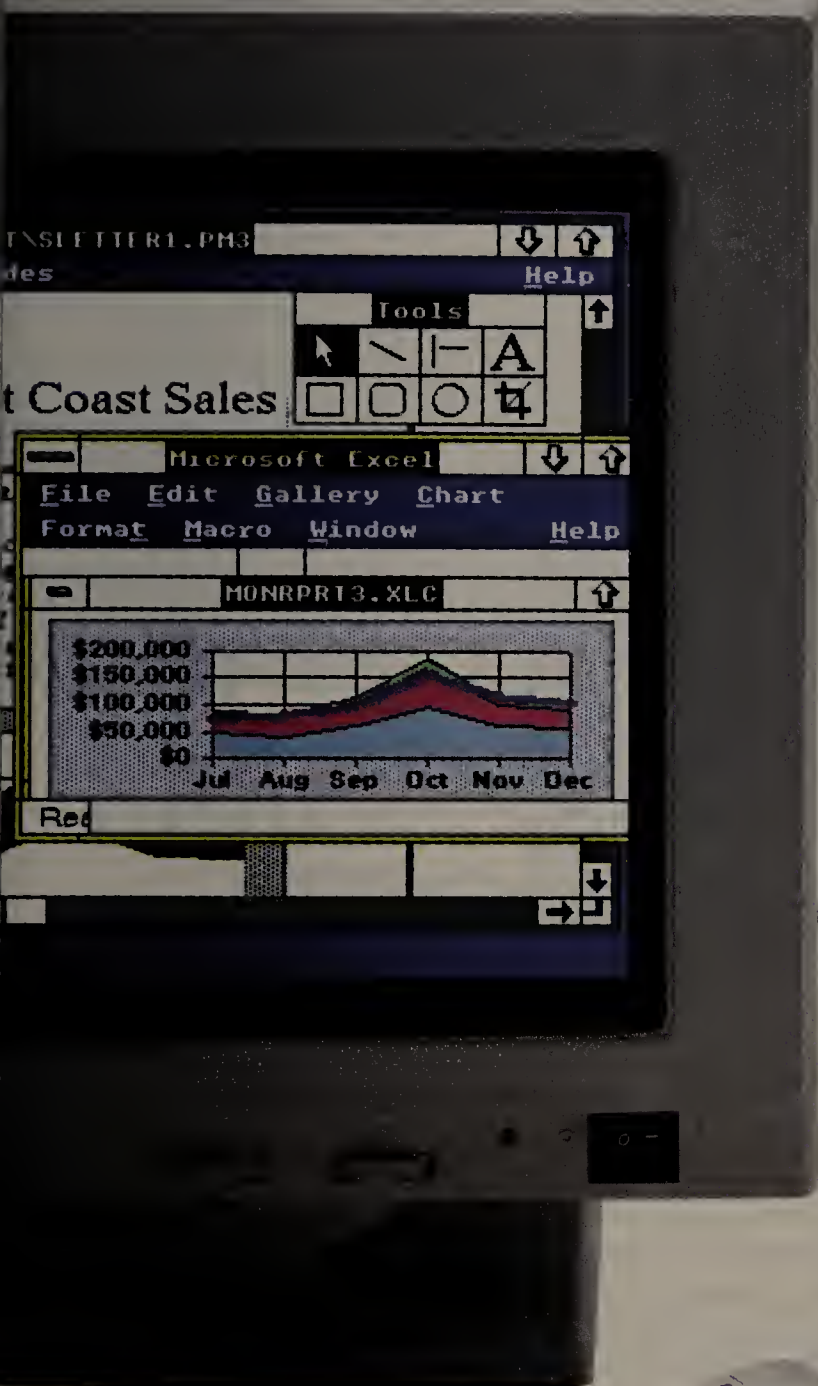
WordPerfect, Microsoft Word, WordStar 2000, Sprint, Framework III, XyWrite III+, and Samna Word IV take advantage of RamFont. But given the turn toward graphics software, most see RamFont ending up as a low-end DOS product. "It does some nice things in the character-based environment, and we support it for Microsoft Word, but when you get into the graphics environment it doesn't do that much," a Microsoft spokesperson says.

Few, though, count Hercules out altogether. "They had a hit, then a strikeout," says Dataquest's Malik. "But in PC graphics, they are not anywhere near the last inning. The third phase of graphics is yet to come; they have another chance." —John Eckhouse

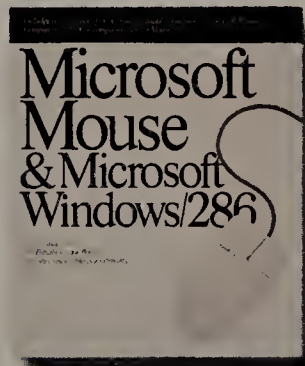
Push your software to the limit.

If you want to get the most out of today's new, high-powered software applications, we have a few words of advice:

Use a Microsoft® Mouse.



The Microsoft Mouse gives you easy access to all the powerful features today's software has to offer.



It looks innocent enough here, but wait until you see how the Mouse makes your software scream.

The Mouse can unleash your software—and take full advantage of the features intended to make your work easier.

With the Mouse you can effortlessly manipulate menu-driven applications without taking your eyes off your screen. You can pull down menus. Highlight text in one fell swoop. Copy, cut and paste formulas in spreadsheets easily. And move things from here to there without any command-key mumbo jumbo.

Literally hundreds of applications support the Mouse. But as the leading software developer for personal computers (and one of the first to bring a graphical interface to PC screens), we've gone a step further:

Microsoft Windows/286 with PC Paintbrush® for Windows, Microsoft Paintbrush or EasyCAD™2 actually come with the Mouse (or vice versa).

Already, the Microsoft Mouse has made its way into the hands of over one million personal computer users. And that number is sure to grow even faster. After all, graphically oriented software is the driving force behind improved productivity.

But it's the Microsoft Mouse that puts you in the driver's seat.

Microsoft®
Making it all make sense.™

©1988 Microsoft Corporation. All rights reserved. Microsoft and the Microsoft logo are registered trademarks and the Microsoft Mouse design and Making it all make sense are trademarks of Microsoft Corporation. EasyCAD is a trademark of Evolution Computing. PC Paintbrush is a registered trademark of ZSoft Corporation. For more information, call (800) 541-1261. Customers in Canada call (416) 673-7638, outside North America, (206) 882-8661.

Nestor

(continued)

patterns or classifications in huge volumes of raw data—a task conventional computers fail at miserably (see “Neural Nets: The Dream Machines,” *PCW*, December 1987).

Nestor's core products are the Decision Learning System (DLS) and the Nestor Development System (NDS). DLS is targeted at the financial services industry, where the ability to see patterns in data is of enormous value. (One example: Mortgage defaults in the United States exceed \$2 billion per year, and identifying even a fraction of potential bad loans would aid any mortgage company.) Nestor negotiates a license and royalty arrangement for DLS based on the estimated value of the resulting application.

One DLS licensee is the New York firm of Oliver, Wyman and Company, a management consultant for the credit industry. Partner Peter Carroll says the choice of neural nets “seemed obvious, once we realized they are very good at pattern recognition.”

Initially, Carroll says, building a mortgage-underwriting expert system with a neural network is similar to creating a rule-based expert system: The developer asks the human underwriters what data they rely on. However, it's not necessary to know the data's significance or how it's employed. The network scans a data base of mortgage applications and lending decisions, then finds the relationship itself. “The biggest prob-

lem is finding data, not training [the neural net] or understanding the concepts,” Carroll says.

Outside the financial services industry, Nestor sells its other product, NDS, at \$495 per copy and more. The company also provides customer training and consulting.

Dallas-based BancTec, for example, is using NDS

to develop financial document processing systems. The BancTec system reads handwritten numbers on checks, reducing labor needed for check processing by up to 60 percent.

BancTec's document processing division vice president and general manager, Richard

Thompson, is reluctant to predict the project's success, but he's satisfied with its progress. BancTec plans beta site installations by midyear. “If it's successful,” Thompson says, “it will mean a significant reduction in the number of keystrokes required to process a bank check.” —Mickey Williamson

Wang Forms PC Division

Trying Central Phone Support

Granted, it had sold almost half a million PCs. And its annual PC revenues were reaching \$400 million. But the \$3 billion office automation supplier knew it hadn't really joined the PC parade, and so Wang Laboratories formed a separate PC group last May.

Like its parent, Wang's Microsystems Division will hawk high-powered, well-connected PCs for corporate users. But prices will dip closer to those of mail-order marketers like Dell, says Graham Beachum, Jr., the division's vice president of sales and marketing.

Wang's first 80386-based machines rolled out in December with price tags beginning at \$4115 for a system with a VGA monitor. “For Wang, that's aggressive,” a spokesperson notes.

The Microsystems Division swiped another mail-order tactic: It will provide product support nationwide from a phone bank at its Drum Hill, Massachusetts, headquar-



Bob Ano is combining Wang technology with mail-order tactics.

ters. In other respects, though, the group will flex traditional big-supplier muscle, fielding a direct sales force of 100. The group will also market through value-added resellers. Both channels will turn over support duties to the Drum Hill operation, Beachum says.

Industry analysts caution that Wang must offer more than cost-competitive products. “Everybody is selling hardware cheap,” argues Michael Goulde, director of corporate information solutions

at CAP International in Marshfield, Massachusetts. However, Robert Cameron, senior analyst with Dataquest's Boxboro, Massachusetts, office, feels that Wang's ability to sell more than just PCs is attractive because “people like to buy everything from one vendor.”

Wang also can tap its comprehensive set of office automation offerings, currently highlighted by the Wang Integrated Image System (WIIS). Based on Wang VS minicomputers, the image system will help Wang sell PCs for use as WIIS workstations, Cameron believes.

Goulde agrees, but criticizes Wang's failure to develop proprietary chips to give its PCs the better-than-VGA graphics that WIIS needs.

In networking, however, Wang is already well positioned. “Wang initially viewed PCs as workstations for the VS, and about 65 percent of our PCs have been sold as desktop devices connected to a VS environment,” points out Bob Ano, president of Wang Microsystems. Wang will ex-

(continues)



© 1988 Hayes Microcomputer Products, Inc.

ERROR-CONTROL FOR FORCES BEYOND YOUR CONTROL.

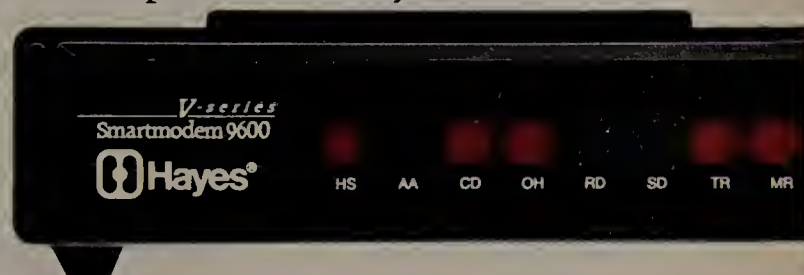
The hazards faced by your high-speed data can be truly shocking.

That's why, in addition to providing the original V-series™ error-control, Hayes V-series 2400 and 9600 bps modems now offer error-control in either international standard, V.42 or X.25.*

The V.42 protocol, for point-to-point communications, automatically detects errors and then retransmits the data correctly. While the X.25 protocol not only offers error-control but also multisession access to value added networks with expanding applications for dial-up X.25 point-to-multipoint communications.

V-series modems still provide users with data compression that can double throughput. And Hayes AutoSync for built-in synchronous communications without the added expense of a synchronous adapter card.

All to give you more control. Because with a Hayes, the only error you can make is not buying one.



For your nearest Hayes Advanced Systems Dealer, call 800-635-1225. Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, GA 30348.

Hayes®

*There will be a minimal charge of \$50 for either an X.25 or V.42 upgrade on products purchased before October 1, 1988. Products purchased on or after October 1, 1988 will include either standard as they become available. For details call Hayes Customer Service: 404-441-1617.

Norton

(continued from page 61)

made his reputation with *The Norton Utilities*, a package of disk and file recovery routines that have gone a long way toward reducing pain and suffering among personal computer users.

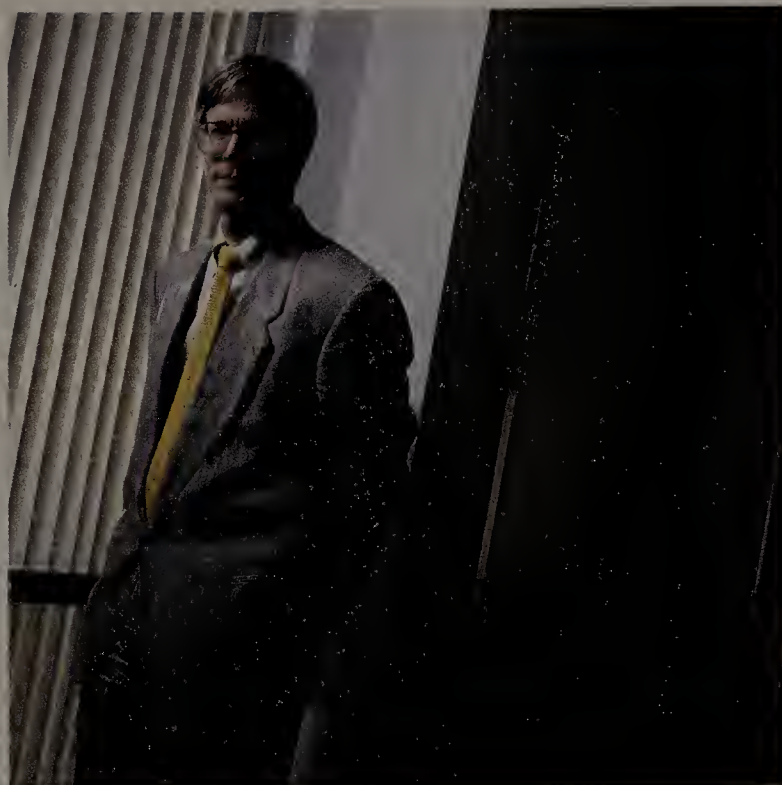
For a few years, Norton gave computer publications as much attention as his *Utilities*. But he turned away from writing in 1987 to devote more time to his "main gig," Peter Norton Computing.

The company has grown to 50 employees and annual revenues of about \$15 million, up about \$4 million from the year before. The *Utilities* accounts for 80 percent of shipments; sales are growing "at a shocking rate" for the *The Norton Commander* (a DOS shell utility), *The Norton Guides* (pop-up reference manuals for computer languages and operating systems), *The Norton Editor* (a small ASCII word processor for developers), and *Dan Bricklin's Demo Program* (a prototyping and demonstration tool).

The company, which dominates the world of file recovery in the United States, is expanding into Europe and the Far East—but not without some interesting problems.

The Spanish version of *The Norton Commander*, for instance, is called *El Comandante Norton*. "At first," says the unassuming Norton, "I was afraid that it would seem militaristic, but I find there's more of a lilt to saying *comandante* than saying *commander*."

As part of its diversification, Norton Com-



Peter Norton still concentrates on meeting mainstream needs for managing DOS.

puting is dipping a toe into the OS/2 waters—but only a toe. Although the firm was an early player in the OS/2 game with *The Norton Guides*, "we're not making a major, major commitment to it. The question is, who

needs to use OS/2? The needs are in DOS."

When asked about utilities for managing local area networks or multi-user systems, Norton laughs and says only that "you can look for some

Wang

(continued)

tend this original network strategy to include versions of *OS/2 LAN Manager* and Banyan's *Vines* network software.

The company also enjoys extensive cross-licensing agreements with IBM, which Beachum says would pave the way for machines compatible with the Micro Channel Architecture. Outsiders expect the firm to launch such products by midyear.

In its bid to sell more PCs, Wang has another powerful weapon: *Freestyle*, a communications system that lets AT own-

ers use an "electronic pencil" to quickly append written or spoken notes to documents or other files, and then mail the notes electronically. "It's the applications that sell the hardware, and *Freestyle* has lots of sex appeal and flash," Cameron observes.

Presently, *Freestyle* continues a Wang tradition of high cost (a fully configured system with PC sells for around \$12,000) and half-steps toward industry standards (it works only with Wang proprietary networks). But Cameron predicts Wang will cut *Freestyle's* price, and Wang says it will adapt *Freestyle* for the OS/2 Presentation

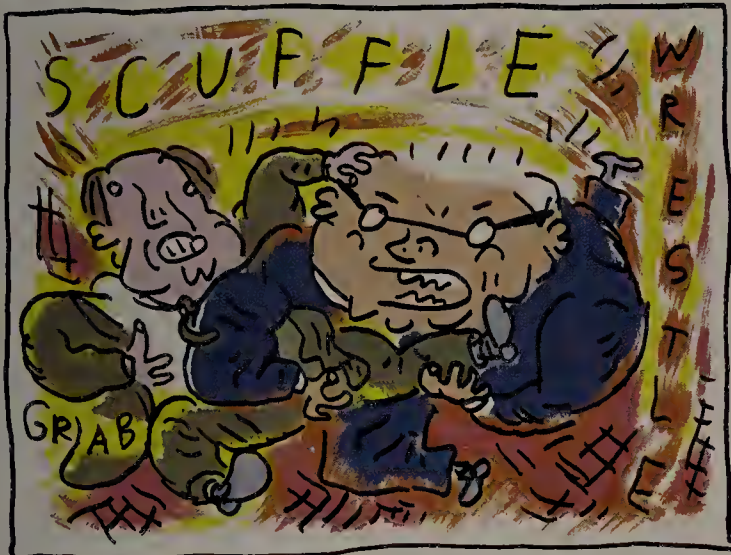
very interesting things from us."

Norton's firm is not alone in its niches. But the *Commander* is "far and away the leading disk management program," says Peter DeWitt, a product manager for Corporate Software in Westwood, Massachusetts. *The Norton Utilities* has lengthened its lead, he adds, thanks to automated disk recovery and fortuitous delays to a competing program, Central Point Software's *PC Tools*.

Norton sees his products as targeting the mainstream of the disk recovery market, while Paul Mace Software's *The Mace Utilities* is aimed at techies and *PC Tools* goes for the budget-minded. "It works out less as competition than as market segmentation, which is dandy, because it's really serving the customer very well." —Daniel J. Rosenbaum

Manager. Even more important, the Microsystems Division is developing a *Windows* ease-of-use extension that accepts unmodified *Windows* applications—another sign that Wang is ready to play in the open architecture arena. —Edward Warner

John Eckhouse reports on business for the San Francisco Chronicle, Daniel J. Rosenbaum frequently contributes to PC World, Edward Warner is a freelance writer based in Boston, and Mickey Williamson has written extensively on artificial intelligence. ●



A Few Words Most Celebrated



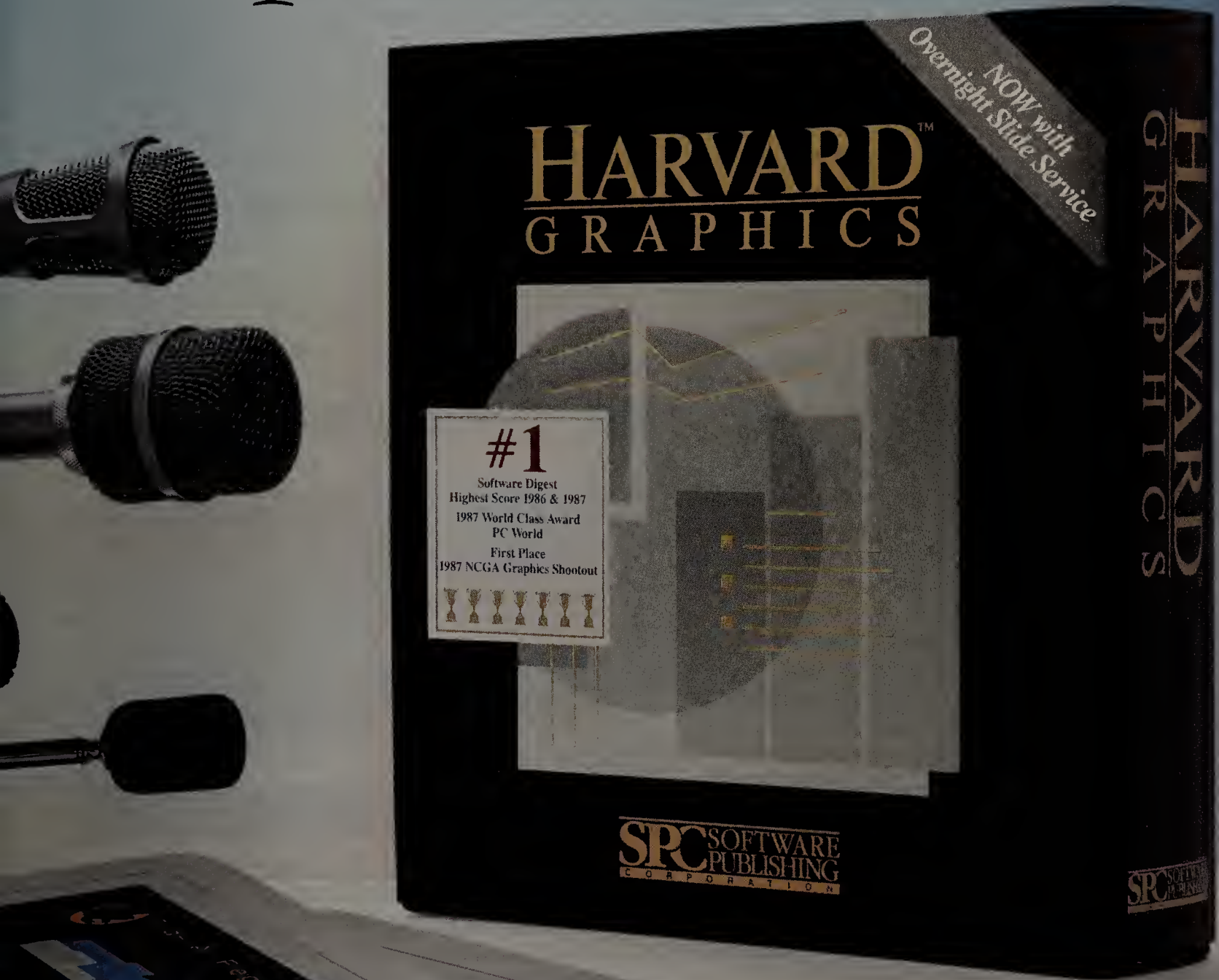
Thank you. For those of you who haven't heard, Harvard Graphics from Software Publishing has gotten a lot of recognition from the trade press. Why, you may ask? Certainly our crisp, high-speed output helped influence InfoWorld readers to name us Product of the Year. And the easy access to so many chart

and graphing options must have helped PC World's audience give us their World Class Award for the second year running.

Actually it must have been all those things and more. Otherwise why would PC Magazine call Harvard Graphics "the de facto standard" software for business graphics?

F O R A F R E E T R I A L D I S K, C A L L

From The World's Graphics Software.



Of course, the experts aren't the only ones who favor Harvard Graphics. In fact, with its growing popularity, Harvard Graphics has become the number-one selling business graphics software.

And naturally we'd like to invite those of you who haven't tried Harvard Graphics to call us for a free trial disk at the toll-free number below.

In a matter of minutes, it'll give you a vivid demonstration of the qualities that make us the graphics superpower.

SPC SOFTWARE
PUBLISHING
CORPORATION

1 - 8 0 0 - 3 4 5 - 2 8 8 8, O P E R A T O R 5 3.

© 1988 Software Publishing Corporation, 1901 Landings Dr., Mountain View, CA 94039-7210.

Magellan Finds Faster Work Routes

Lotus's navigator gives you clear sailing to any file on
your hard disk—

and keeps your disk trim into the bargain.

Eric Bender

Nature abhors a vacuum, and so does a hard disk. If you've been running more than one application for any appreciable length of time, your disk is probably stuffed with hundreds or even thousands of files in diverse formats. And when you're in a big hurry to find one file in particular—say, a five-month-old memo—you need a guide like Lotus's *Magellan*.

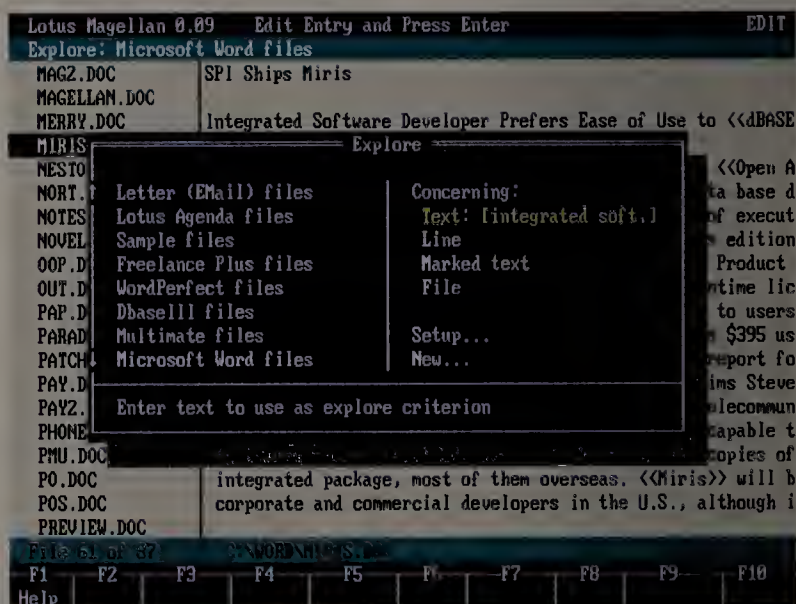
Magellan strives for mastery over this world of dissimilar files, helping you quickly find what you need and assert control of everything under the hatches. It's a powerful PC navigation center that lets you rapidly read files from numerous popular applications, search text

via an innovative indexing scheme, and issue snappy DOS commands.

Skimming O'er the Maze

Magellan opens with two windows, split vertically. The one on the left shows a list of files, and the right window, called View, displays the contents of each file—regardless of its format. This almost instantaneous translation can save you substantial amounts of time. You can zip through a crowded directory with one eye on the View window, rather than puzzling over whether you're looking at, say, a *WordPerfect* or *Word* document and then loading the appropriate application.

A list of function key assignments is ever-present along the bottom of the screen; a second row pops up when you hit <Alt>. These keys and a judicious handful of dialog boxes are all you need to



Magellan offers easy-to-use tools for locating files and displays file contents almost instantly, regardless of format.

know, which keeps *Magellan*'s learning curve low.

A status line at the top of your screen displays the exploration path that produced the list of files in the left window. If you want to limit the list, say to 1-2-3 worksheets, you can type in a new path like c:\123*.wks, or sort the list by path, extension, or other parameters. *Magellan* recognizes DOS wild cards and adds some ingenious file-finding shortcuts of its own:

c:\LOTUS**.wk?, for example, would ferret out every spreadsheet in every subdirectory of the \LOTUS subdirectory on drive C:. Another route is through the Explore function, which brings up a dialog box offering you a choice of file groups. You can select from the many built-in menu choices; you also can define file groups quickly.

Once you've found the proper file, you can en-

PC World previews are informal assessments of products that at press time were still in the development stage. Complete reviews—including features evaluations and performance testing—will appear only after a product is officially released.

large a window or even zoom it to full screen—to find the file size or date, or see the contents in its entirety. Moreover, the package allows you to mark sections of text throughout your disk and gather them together into an ASCII file without disturbing the original files.

If you want to edit or change a file, you can launch directly from *Magellan* into the appropriate application—assuming it's installed on your hard disk. (*Magellan* checks your disk at installation and modifies the Launch menu appropriately. As with Explore, you can easily attach packages that aren't already on the menu.) The application comes up with the file already loaded. When you exit that package, *Magellan* reappears.

Search Me

Magellan adds an innovative text-search capability aimed at overcoming two restrictions on current text-search packages like Microlytics's *Gofer*: the awkwardness of using Boolean tools, and the limited speed of sequential file searches.

Naturally, Boolean techniques are essential for narrowing searches of massive data bases like those on Dow Jones News/Retrieval. But Lotus maintains that Boolean commands are not particularly intuitive—an argument supported by many

who find on-line searches only slightly less intimidating than particle physics.

Instead, *Magellan* employs a "fuzzy searching" technique based simply on a few likely words or phrases. To begin the search, you first pick the file group in the Explore dialog box and then type in a series of words likely to appear. *Magellan* produces a weighted and ranked list of files expected to produce matches. You can then browse the files via View.

You also can begin your search with a line or marked passage of text. Or you can build a Boolean search on the Explore line with AND, OR, and NOT operators.

Before embarking on a fuzzy search, though, you'll have to index your files. *Magellan*'s indexing scheme accelerates searches and takes minimal disk space, roughly 6 percent of the size of the indexed files. The initial indexing can take a while, depending on the number of files and your hardware configuration. Indexing 651 files on a Compaq Portable II, for example, required a little under 20 minutes. You update the index incrementally whenever you like.

On a large disk containing thousands of files, searches can dawdle. In these circumstances Lotus suggests creating more focused indexes. These indexes also enable you to distribute custom-

ized data bases to other *Magellan* users: You build a group of files, index that group, and then copy all to a floppy disk.

Macros Round the World

Magellan offers command line shortcuts, like starting up with *mg *.wks* concerning "sales". Additionally, you can write macros via a learn mode or simple commands—so the program opens with worksheets sorted by date, for instance.

The package does not compete with hard disk maintenance utilities like *The Norton Utilities*, but it does incorporate standard DOS shell capabilities, including tree directory displays plus the ability to copy, delete, and rename files, singly or in batch mode. View also helps you run a tighter ship by letting you instantly view files whose names offer no clue of origin.

Like its namesake, who stepped onto the wrong beach one day in 1521, the precommercial *Magellan* doesn't always complete its voyages. Support for many popular packages is not entirely implemented, and the software is too RAM hungry to work with many memory-resident packages like *Lotus Express*, although the company says it will solve both problems with the shrinkwrap version. The package also will face

competition from upcoming offerings like Traveling Software's *Papillon*. But *Magellan* looks like a strong and savvy pilot. ●

Eric Bender is PC World's East Coast editor.

SNAPSHOT

Magellan

Lotus's utility charts courses through your hard disk, helping you find information, view files, and organize the disk.

KEY FEATURES

- Displays contents of files from many popular applications in less than a second
- "Fuzzy searches" locate any textual information on a hard disk
- Text-gathering from multiple files
- DOS shell capabilities

AVAILABILITY

Scheduled for first quarter 1989

PRICING

\$195

Lotus Development

55 Cambridge Pkwy.
Cambridge, MA 02142
617/577-8500

For more information, circle 710 on reader service card.

SideKick for Presentation Manager

For a glimpse at computing in the nineties,

look no further than Borland's SideKick for Presentation Manager.

Eric Knorr and
Karl Koessel

We've seen the future: It has stunning graphics, requires at least 3MB of RAM, and does a little less than it once did.

Yes, *SideKick for Presentation Manager* is here, the first application available for OS/2's *Windows*-like front end. Now shipping free with IBM OS/2 1.1 Standard and Extended Editions, the program reinvents versions of the original *SideKick*'s Calculator, Notepad, Time Planner (derived from the original Calendar), and Phonebook.

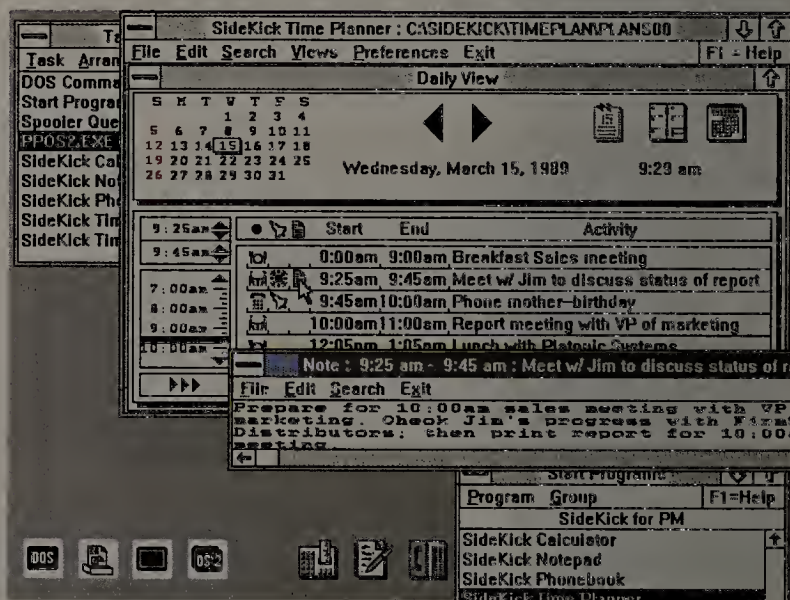
You can't really call *SideKick for Presentation Manager* a utility. It's a completely rewritten product built around the *Paradox* data base engine, with the Phonebook and Time Planner employing *Paradox*'s file format. And OS/2 multitasking renders "RAM resident" obsolete; you execute this *SideKick* like any other program.

Brave New Environment

If looks count, then *SideKick for Presentation Manager* leaves just about any DOS application—including most *Windows* programs—in the dust. The attractive user interface makes liberal and intelligent use of icons and fonts, and it's simply a pleasure to use.

As you'd expect of any OS/2 application, installing *SideKick* is a one-button affair. The program automatically creates a directory and five subdirectories whose files together occupy about 2MB of disk space. It also adds the names of the four *SideKick* applications (as a "Group") to the Start Programs menu and slugs a statement into OS/2's CONFIG.SYS file.

Although the minimum RAM requirement for *SideKick* with Presentation Manager is 3MB (and that's without the DOS compatibility box), 4MB is recommended. Needless to say, you also need an 80286 machine or better



A Time Planner alarm has just gone off. Clicking on the adjacent note icon opens the appointment's attachment in a Notepad-like word processor. Notice also the Calculator, Notepad, and Phonebook icons.

to run OS/2, and the program itself is available only on 1.2MB or 1.44MB floppies. VGA rather than EGA graphics resolution is also advisable just for deciphering some of the minuscule icons. A mouse is almost a necessity.

More Than a Face-Lift

The Calculator and the Notepad have always been the most popular *Side-*

Kick applications, and *SideKick for Presentation Manager* gives each a new face and new capabilities.

The Calculator now looks like a snazzy, high-tech calculator, replete with a host of special function keys and an editable tape. You can "press" the keys with a mouse or

use the keypad; the numbers scroll by on the tape, which can be saved as an ASCII file.

Borland dubs the Calculator a "one-column spreadsheet." Unlike the editable tape generated by *SideKick Plus's* Calculator, *SideKick for Presentation Manager's* tape recalculates instantly when you alter entries or operators. You also can save a whole array of tapes for various applications and edit them as required. Additionally, a "memory box" displays the contents of the Calculator's memory, while new business functions let you calculate payments at the beginning or end of a payment period.

Changes to the Notepad may irk some users. The *WordStar*-like editing commands have been discarded in favor of Presentation Manager conventions, which include selection of text and commands with the mouse and simple keystroke combinations for cutting and pasting. The Notepad will accustom you to the basic commands for all future Presentation Manager word processors—whether you're ready or not.

The Notepad supports ASCII documents of up to 64K. It offers tabs and search and replace functions but doesn't accept wild cards. The Presentation Manager's Clipboard

—a window for cutting and pasting data between OS/2 applications—performs roughly the same screen-capture tasks as the old *SideKick's* Notepad. Together, the Clipboard and one or more sessions of the new Notepad can work like a word processor with windows.

The Organizing Principle

Of the four applications, the Time Planner is the most complicated to learn. It offers daily, weekly, and monthly views of your schedule, and lets you attach notes, perform searches, and set appointment alarms.

To record an appointment, you begin by double-clicking on the preferred day and selecting a time period on a graphical "time odometer." Confirming the range creates an entry on the daily calendar, which can hold a frightening 256 appointments per day.

You have a choice of ten tiny category icons to classify the type of appointment—symbols for business meetings, meal-time appointments, phone calls, and so on. One icon indicates that an alarm has been set, while another type shows whether a note is attached (notes are recorded and retrieved via the Notepad).

One of the flashiest features—also offered by

SideKick Plus—is a search function that finds unscheduled time based on such criteria as length of the appointment, time of day, and day of the week. You can also search for text strings and go to specified days.

Additionally, the Phonebook can search across multiple fields. In fact, like *SideKick Plus's* Phonebook, it is actually a rudimentary flat-file database, providing both form and table views. But *SideKick for Presentation Manager* adds the ability to customize the data entry form and to rearrange columns in the table. You could even turn the customizable Phonebook form into a front end for *Paradox for OS/2*.

The Phonebook holds up to a billion records and includes a handy speed-dial list for common numbers. Unlike earlier versions, however, it won't let you simply pop into another application, select any number on the screen, and dial it.

SideKick for Presentation Manager lacks the minimal telecommunications program and the outliner bundled into *SideKick Plus*. These missing pieces won't bother most *SideKick* users, since few switched to the *Plus* version anyway. More important, this big, hardware-hungry program needs about 20 times the RAM of its immediate predecessor, and

it does less—although with greater ease and elegance. And that, in the near term, is the shape of things to come. ●

Eric Knorr is a senior editor and Karl Koessel is technical editor for PC World.

SNAPSHOT

SideKick for Presentation Manager

The first Presentation Manager package, *SideKick* recasts the applications that made the DOS version famous.

KEY FEATURES

- Calculator, Notepad, Time Planner, and Phonebook applications
- Clear, easy-to-use interface fully exploits Presentation Manager conventions
- File format compatibility with Paradox

AVAILABILITY

Immediate

PRICING

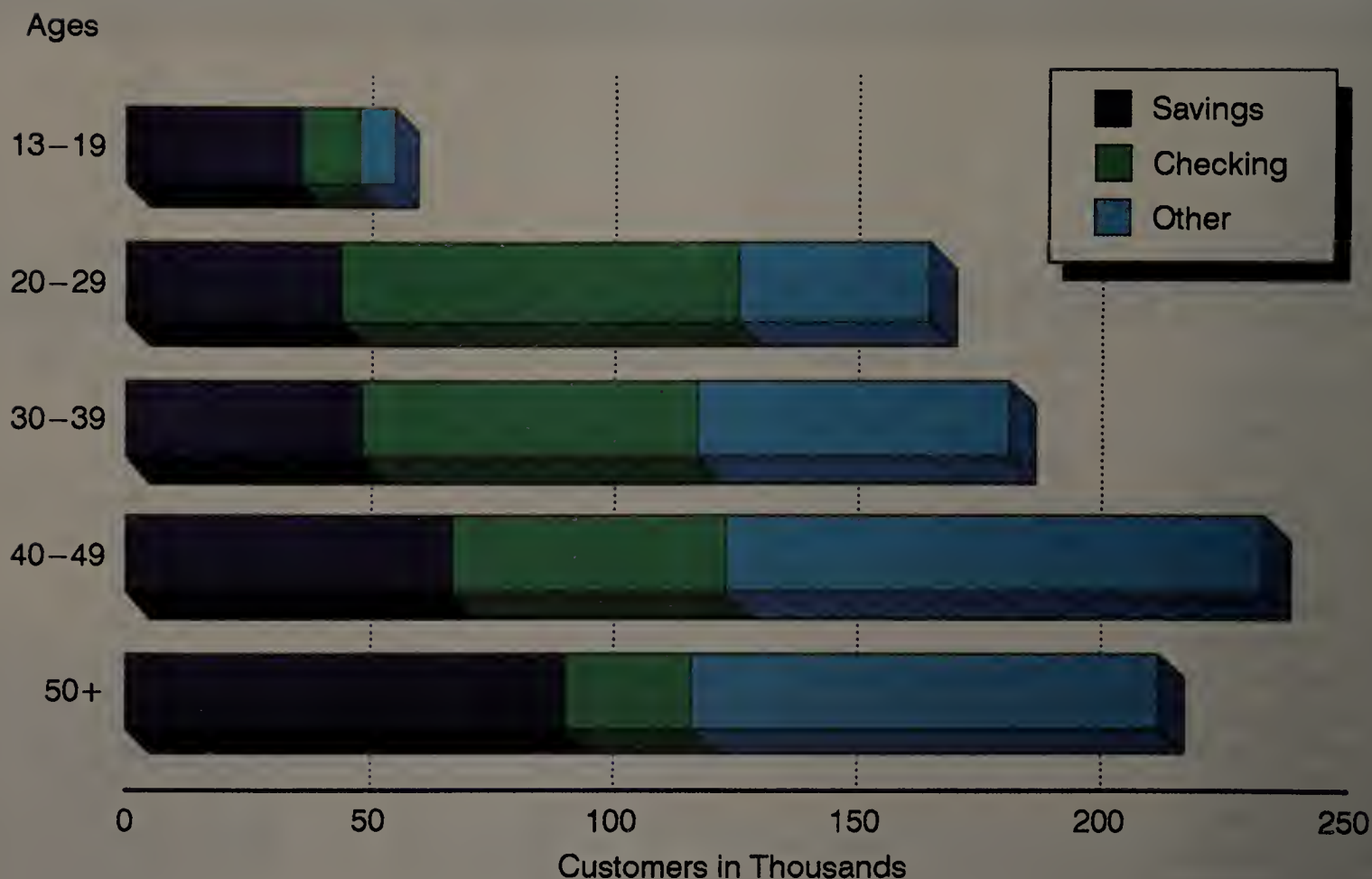
\$250; free with IBM OS/2 1.1

Borland Int'l

1800 Green Hills Rd.
P.O. Box 660001
Scotts Valley, CA 95066
408/438-8400

For more information, circle 760 on reader service card.

Use of Bank Services



Full-featured charting.

If it were any other this would be

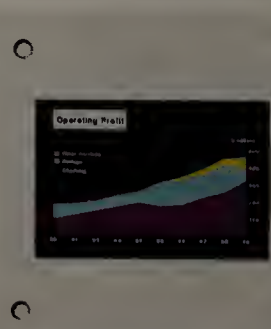
There's only one way to get complete charting and drawing together. The new Freelance® Plus Release 3.0.

It's the leading graphics software with dramatically improved charting, enhanced drawing, and all new presentation capabilities.



Now you can scan images such as photographs onto overheads or paper.

It means charting so improved, it's nearly effortless. With 12 popular preset formats and many style options to automatically format large numbers of charts. Plus unmatched data links that make it



Freelance Plus makes creating slides an easy way to make a point.

to create unique images like logos.

Preparing presentations is painless with

simple to tap spreadsheets and databases for graphing.

And drawing? Create simple diagrams, like flow charts, to communicate concepts and ideas. Then enhance your graphics with symbols and maps. Or use freehand drawing tools

Lotus Freelance Plus 3.0 Free Demo Disk Offer

Take a look at everything you can do with the full-featured charting and drawing in the New Freelance Plus. Simply mail this card to Lotus or call **1-800-345-1043** to receive a free self-running Demo Disk. Please specify the appropriate disk format:

Disk Format: ☐ 3.5" AKT-1665 ☐ 5.25" High Density AKT-1688 ☐ 5.25" Low Density AKT-1678

Name: _____

Title: _____

Company: _____

Address: _____

City: _____ State: _____ Zip: _____



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

First Class Permit No. 1359 Cambridge, MA

Postage will be paid by addressee:

LOTUS DEVELOPMENT CORPORATION
Attn. Freelance Plus Demo
P.O. Box 9158
Cambridge, MA 02139-9939

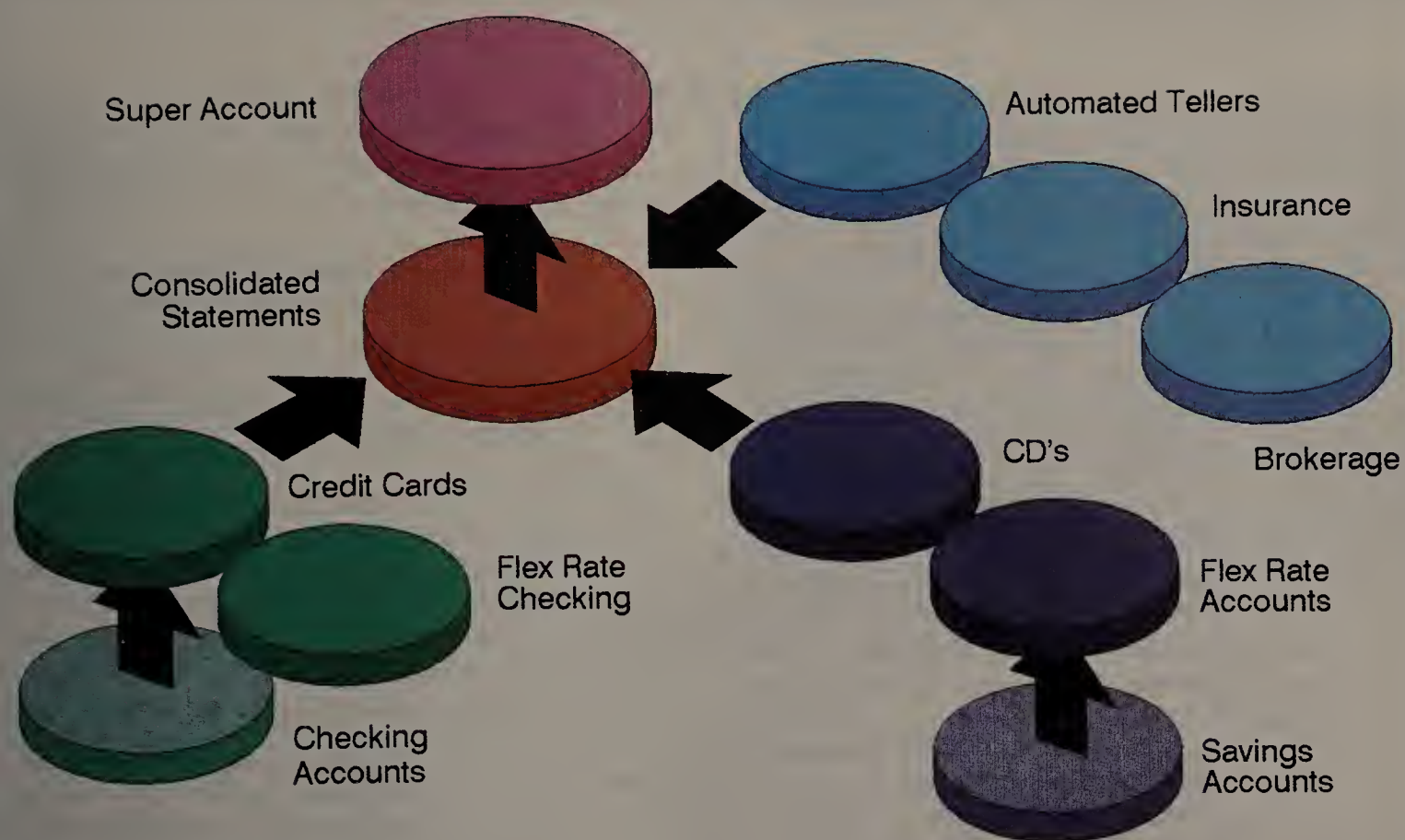


er
e

ts
ng.
e
w
n
th
se

emarks

Super Accounts Consolidate Services



Full-featured drawing.

graphics software, a one page ad.

major file formats including Symphony®, dBase®, TIFF, SYLK, HPGL, ASCII, PostScript® EPS, and Metafile® (CGM).

Call **1-800-345-1043** for a self-running demo disk and ask for AKD-1665 for a 3.5" version, AKD-1688 for 5.25" high density, or AKD-1678 for 5.25" low density.

You'll see all the ease and beauty of Freelance Plus 3.0.

Because even with two full pages, we couldn't show it all.



New Service Poised to Enter Market

- Super accounts attract customers
- Consolidation of services
- Ease of banking
- Super accounts are competitive
- Super accounts are good for the bank
- Consolidation of accounting
- Greater earning potential

Text charting is one way to help you emphasize information.

transitions like fades, wipes, dissolves, and more.

Freelance Plus 3.0 works like 1-2-3®, and *with* 1-2-3. And it supports all

The New Lotus Freelance Plus 3.0

78 PRODUCT OUTLOOK

PC LightCard

Give older workstations new life with SunRiver's fiber optic multiuser system that lets PCs access the processing power of a 386 host.

SpeedStor AT650E, LANStor LAN650E

If 651MB of storage on a single 5¼-inch hard disk sounds appealing, take a look at Storage Dimensions' internal subsystems for AT-class machines and LANs.

OmniPage

Caere's board/software combo turns PC-based scanners into full-page recognition systems that can handle multiple mixes of fonts, graphics, and formats.

The Complete Communicator

Offices with only one phone line can move into the communications age with a single add-in board that combines fax, voice mail, and a 2400-bps Hayes-compatible modem.

Pentax SB-A4301 Image Scanner

You no longer have to tend your scanner every page of the way—the Pentax feeds automatically like a photocopier and claims to reduce image distortion dramatically.

Ultra 16, LM-317

A brace of very high resolution monitors—the color Ultra 16 works with a wide selection of adapters, while the monochrome LM-317 lures desktop publishers with side-by-side page viewing.

Per:Form

Creating forms just got easier—*Per:Form* supplies lots of design elements and breezes through tricky jobs like making grids.

86 BRIEFLY NOTED

Venture—The Entrepreneur's Handbook

Hitch your wagon to a business plan with a sophisticated tool that includes more than two dozen performance-analysis templates and a planning module developed by the USC Business School.

Instant Image 5500

Every time your system saves a file, Instant Image prompts your tape backup to save it, too.

NetWare SQL

A companion to *NetWare*, this SQL engine lets LAN users choose their front-end application while retaining access to a central data base.

NetWare SNA Gateway, NetWare 3270 LAN Workstation

Gateway hooks up 97 workstations with a single host and offers numerous ways to make the connections; *Workstation* provides the necessary terminal emulation.

@WSLink, Look & Link

Two 1-2-3 add-ins ease the strain on your computer's memory by breaking one worksheet into several and dynamically linking their cells.

90 UPDATE

IBM Token-Ring Network 16/4 Adapter, 16/4 Adapter/A, Token-Ring Network Bridge Program 2.1

Whether you're riding an AT or MCA bus, IBM's Token-Ring just got four times faster.

Crosstalk XVI 3.7, Crosstalk Mk.4 1.1

XVI can now operate in the background, and *Mk.4* has acquired CASL and works with additional drivers, terminals, and protocols.

Mirror III

A scripting language called PRISM and faster file transfer enhance this *Crosstalk* clone.

Disk Technician Advanced

Optimize hard disk performance, diagnose and doctor one or two hard disks, and recover the FAT when your system crashes.

Complete Statistical System 2.1

Four new statistical modules, a proprietary integrated programming language, and a presentation-quality graphics system round out this upgrade.

PC LightCard

Light Speed

Many products can put the zip of the 80386 chip in your tired old PC. Now comes a product that will put 386 zip in multiple PCs. PC LightCard from SunRiver is designed to let a number of older workstations access the processing power of an 80386 multiuser host at "the speed of light."

PC LightCard's fiber optic technology lets a host 386 share information with and display bit-mapped graphics on a work group's pre-386 PCs. The remote workstations are linked to the host via full-duplex fiber optic cables in a star configuration, allowing a direct run of up to 1000 feet to each remote. The system transfers data at a meteoric 32 Mbps—far outstripping the maximum 10 Mbps of an ether-

net network—and connections are virtually immune from electrical interference or cross talk.

SunRiver is positioning PC LightCard as a low-cost alternative to local area networks, although the system also works in conjunction with a net to access other departmental systems or a mainframe. All users on a SunRiver system share the 386's high-performance features, such as 32-bit memory, a powerful CPU, math coprocessors, and a fast hard disk. And unlike most small multiuser systems, PC LightCard doesn't limit remotes to text-only display.

When workstations don't require host processing, they can be hot-keyed back into the stand-alone mode, essentially giving each machine a dual personality. Users can use the disk-based programs they know and



For work groups that pass around 500K CAD files or tap into multi-megabyte data bases, SpeedStor will store 651MB of formatted data on one 16ms 5¼-inch hard disk. LANStor offers the same capacity for LANs.

love yet tap into the speed and power of programs on the host.

In addition to DOS on the workstations, you'll need a multiuser control program on the 386 system, such as Virtual Systems' *Quick Connect*, which loads on top of DOS. Other options are PC-MOS/386 by Software Link, Concurrent DOS 386/Multiuser Graphics Edition from Digital Research, VM/386 by IGC, and various UNIX derivatives.

A full-size board, PC LightCard fits into any available 8- or 8/16-bit slot on the remote workstation. All processing is performed by the host, which is outfitted with a SunRiver Fiber Optic Host Adapter in a 16-bit slot. Each adapter draws very low wattage from the host machine and supports up to 4 remotes. SunRiver recommends 4 to 6 remotes for memory-intensive applications such as computer-aided design and as many as 12 for of-

fice applications such as word processing and spreadsheets.

The retail price of a single PC LightCard is \$899; each adapter is \$799. Ready-to-install cable, available from SunRiver in lengths of up to 1000 feet, starts at \$110 for 25 feet. Hardware on the adapter supports remote monitors, including Hercules-compatible monochrome, EGA, enhanced EGA, VGA, and enhanced VGA. SunRiver Corp., 108 Business Park Dr., Jackson, MS 39213; 601/957-0100, fax 601/957-3253. —Glenn Grant
Reader service no. 650

SpeedStor AT6-50E, LANStor LAN650E

Wide-Open Space

PC processing power long ago reached the point where it could provide inexpensive microcomputer



PC LightCard lets your work group's older workstations access the processing power of an 80386 multiuser host at the speed offered by fiber-optic cable. It even displays bit-mapped graphics.

solutions to minicomputer-size problems. But PCs still lag behind minis in storage capacity. If your work group passes around 500K CAD files or taps into multimegabyte transaction-oriented data bases, you may already have faced a difficult choice between an expensive proprietary mini or a PC with a not-so-efficient chain of hard drives.

Storage Dimensions offers another option: two internal PC hard disk subsystems, either of which gives you 651MB of formatted data storage on a single 5¼-inch hard drive. That's almost twice the capacity of most manufacturers' internal 5¼-inch drives, and it's all available in a single volume for that really massive data base.

The SpeedStor AT650E (for IBM ATs and compatibles) and the LANStor LAN650E (for ATs on local area networks) each works its magic through an ESDI controller, which replaces your current hard disk controller and plugs into any 16-bit slot on the AT bus. SpeedStor, which runs under DOS or Xenix, lists for \$7395.

LANStor, designed for Novell NetWare file servers, is only \$100 more. Each drive mounts in a standard peripheral bay in your computer.

The drives are tested and formatted for DOS/Xenix or Novell installation prior to shipping and include a disk-diagnostic and -formatting utility that helps you configure the subsystem for your computer's particular set-up. The software breaks the 32MB partition limit of DOS versions earlier than 4.0, allowing anything from 24 partitions to a single 651MB partition. You can even span volumes and have a single 1.3GB partition across two drives. The systems are backward-compatible from DOS 4.0 and work with any well-designed DOS shell.

SpeedStor transfers data three times faster than a standard AT drive and 50 percent faster than the speediest PS/2 drives, regardless of drive size, according to Storage Dimensions. SpeedStor and LANStor achieve an average access time of 16ms and a blazing 15-Mbps

data transfer rate by packing a total of 414.7 kilobits of available user storage under 15 read/write heads. (In contrast, a typical 30MB AT drive has 52.2 kilobits under 6 heads.) Data transfer is especially fast when reading or writing a single large block of data, such as a worksheet.

Many typical throughput-maximizing techniques just can't keep up with these drives. Neither drive includes elevator seeks (which retrieve the closest data first). Nor does either drive include caching, because caching controllers can't keep up with the high data transfer rate.

But then, these drives don't need any help. The only things close to SpeedStor and LANStor in storage capacity are optical disks. But optical drives' sluggish 104ms average access time and typical transfer rate of 200 kilobits per second make them six to ten times slower. Storage Dimensions, 2145 Hamilton Ave., San Jose, CA 95125; 408/879-0300. —Glenn Grant

Reader service no. 651

capture the leading role in data-input dramas.

Caere's OmniPage recognition system is a board/software combo that gives the average PC-based desktop scanner capabilities usually found on far pricier models—principally, the ability to scan a whole page, containing multiple typefaces, at once. Exploiting a muscular coprocessor, OmniPage helps your scanner recognize any font, number of columns, and mix of graphics, regardless of format. So you can scan not only mailing lists and typed documents but résumés, forms, magazine articles, and spreadsheet data.

Once it is scanned and recognized, the material is in ASCII format and can be converted to any of 18 word processing formats as well as data base, spreadsheet, and desktop publishing file formats. OmniPage adds even more horsepower to text-scanning applications by including a free copy of *Dragnet* software for non-indexed text retrieval.

OmniPage for the PC bundles in a run-time version of *Microsoft Windows* and an add-in board packed with a Motorola 68020 coprocessor and 2MB of memory. The powerful coprocessor lets page recognition proceed in the background while you scan more pages or go about other business.

Thanks to a heavy complement of on-board memory and special multitasking software, OmniPage handles files up to 1.4MB—the size of a scanned legal-size document—without requiring expanded or extended memory. The board fits in an



Caere's OmniPage board/software recognition system lets your PC-based desktop scanner capture a whole page at once—including multiple fonts, formats, and graphics.

OmniPage

No Bit Player

Inexpensive desktop scanners have generally been consigned to supporting roles in graphics image capture because of their limited ability to recognize different typefaces and columnar formats. But once they're outfitted with Caere Corporation's add-on, OmniPage, they'll be able to

OUR NEW PRINTERS MAKE EVEN BAD WRITING LOOK GOOD.

CHAPTER ONE THE BLACKEST HOUR IS MIDNIGHT

It was not a night fit for man or beast what with the sky being as black as ink and it starting to rain like cats and dogs. As if things weren't bad enough Jeffrey Whipple had to climb all the way up to the top of Bald Eagle hill in his snakeskin boots so new their smell reminded him of a car he once leased in Flagstaff, Arizona just to check things out because earlier in the day a message had gotten through that there was going to be trouble this night so he was feeling ominous as the dry wind whipped up the dust around his feet and wondering if he should go on or go back to camp when suddenly, he heard a twig crack behind him or thought he did but as he turned he ... it see anything except the black bleakness of the

We're sorry that our new 24-wire Pinwriter® P5200 and P5300 printers can't do much for the quality of your writing. But they can certainly do wonders for the way it looks. The secret is the ribbon. Other dot matrix printers only use a fabric ribbon. Our Pinwriters print with both a fabric and a letter-quality, multi-strike film ribbon—the same kind used on executive typewriters.

The NEC Pinwriters can also enhance your writing in other ways. They have seven resident type styles. Plus four more are available on plug-in font cards. Which means you can express your thoughts with just the right typeface. You can also get an inexpensive, user-installed color option. And if graphics are part of your story, these Pinwriters produce the highest resolution of any printer you can buy.

Call NEC Information Systems at 1-800-343-4418 to see how much better our new Pinwriter P5200 and the wider P5300 can make your writing look.

Whether you're a budding Hemingway, or a Hemingway & Company.

**NEC PRINTERS. THEY ONLY STOP
WHEN YOU WANT THEM TO.**

NEC



NEC Information Systems, Dept. 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.

8-bit slot and runs on any Windows-capable PC.

OmniPage comes with drivers for Hewlett-Packard's ScanJet and the Canon IX-12 scanners and is compatible with desktop scanners that produce TIFF files. OmniPage for DOS systems retails for \$2495. You get your free copy of *Dragnet* by showing a registration card. Caere Corp., 100 Cooper Ct., Los Gatos, CA 95030; 800/535-7226. —Mark Henricks
Reader service no. 652

The Complete Communicator

Voice, Fax, and Modem in One

If you regularly send E-mail and fax messages over the phone, but your small business or home office has only one phone line, The Complete Communicator add-in card brings you into the age of high-tech communication. And you don't have to install another phone line. The Complete Communicator combines a 9600-bps group III fax board, a PC-based voice-mail system, and a 2400-bps Hayes-compatible modem on one card that fits in an 8-bit slot.

The board comes with memory-resident fax software that receives, sends, and prints in the background. A flashing light in the lower right corner of your screen alerts you to incoming faxes while you work in another application. You can send faxes from within various graphics and word processing programs by calling up a menu for the

memory-resident software and keying in the name and number of the recipient. Distribution lists help you mass-fax to individuals or groups.

The same phone line and a similar background operation handle voice messages. You can call up the PC-based voice mail system and operate it with voice prompts. The system gives you 999 password-protected mailboxes and will forward messages as well as deliver them at prescheduled times.

The 2400-bps modem comes with Bitcom software for the Hayes AT protocol. A future version of the product will comply with the DCA/Intel Communicating Applications Specification, supporting packages that incorporate CAS communications modules.

The Complete Communicator, including 9600-bps fax capabilities, a 2400-bps modem, and voice messaging, is priced at \$899. It requires an XT or AT system with 512K of memory and a hard disk. Displaying fax messages on screen requires a CGA, EGA, VGA, or Hercules graphics adapter. The Complete PC, 521 Cottonwood Dr., Milpitas, CA 95035; 408/434-0145.

—Mark Henricks

Reader service no. 653

Pentax SB-A4301 Image Scanner

Better Feeding Habits

If you're at all serious about desktop publishing, you're familiar with the scanner drill: Put the



Scan documents at a rate of 10 seconds per page using the optional sheet feeder on Pentax's SB-A4301 Image Scanner.

document in the scanner, wait for the transfer to disk, remove the document, insert a new one, wait for the transfer to disk—it's like raising and lowering the lid on a photocopy machine over and over.

But if your document isn't bound together, you don't have to tolerate that in a copier, and now you don't have to put up with it in a scanner either. Pentax Technologies' SB-A4301 Image Scanner features an optional document feeder that ends the waiting game. With the feeder attached, the flat-bed scanner accepts up to 30 originals at a scanning speed of 10 seconds per page, producing output at resolutions of between 39 and 300 dpi.

Pentax claims that its feeder is more accurate and less likely to skew paper than other brands because it doesn't use rollers. Once inserted, each page rests on a glass platen, and the scanner head moves beneath it to capture the image.

Most scanner heads use mirrors and light bars to reflect images to the scanning lens, but each vibrates at a different rate—a potential source of distortion—and it's relatively easy for a mirror or light to get knocked out of alignment. The Pentax head uses a patented folded optical path, which packs all of its mirrors and light sources into a single unit that vibrates at one frequency and significantly reduces image distortion, the manufacturer claims. Naturally, the SB-A4301 also is better suited for scanning books and large documents in single-sheet mode than roller-type scanners.

If you want to reduce or enlarge an image without sacrificing image quality, you'll find the SB-A4301's dithering feature handy. This lets you simulate gray scales on your laser printer and maintain image quality in much the same way newspaper halftones work—by translating a photo's continuous tones into from 39 to 300 dots per inch.



The journey to discovery can sometimes be a long and arduous one.

Especially when it comes to writing database applications.

And especially when you're not a programmer.

All of which is precisely why we built dBASE IV™ with an innovative new feature we call the Control Center.

The Control Center is a logical, intuitive window from which you perform all your key database operations. A constant frame of reference, if you will, for harnessing all of dBASE IV's formidable power.

Through the Control Center, you get simple and understandable access to every one of dBASE IV's modules and functions. Like the powerful Report Writer. The Applications Generator. And much, much more. So that the time it takes to develop your applications can be drastically reduced.

You see, at Ashton-Tate we think that people tend to be more successful when they're able to see the opportunities for discovery right in front of them.

Want to see for yourself? Just visit your local authorized Ashton-Tate dealer for a demonstration, or call 800-437-4329* ext. 2934 for details on videotapes, demo disks, upgrades, and more.

 **ASHTON-TATE®**
INTRODUCING dBASE IV

**“It's a whole lot easier
when you can see
what you're doing.”**



*In Colorado call (303) 799-4900. Trademark/owner: dBASE IV, Ashton-Tate, and Ashton-Tate Logo/Ashton-Tate Corporation. ©1989 Ashton-Tate Corporation. All rights reserved.



Princeton Graphics' Ultra 16 monitor combines multiscanning with high graphics resolutions, matching every graphics card standard from MDA to the 1024 by 768 resolution of IBM's 8514/A.

On the other hand, you also can produce high-contrast line art and text by selecting the scanner's black-and-white-only mode. The SB-A4301 comes bundled with Citadel Products' *Synergy Optical Character Recognition* software, which converts bits into the ASCII characters that they represent. As you scan, you "train" the software to recognize various type styles between 10 and 24 points. The resulting text file can be imported into most word processing programs.

Also included in the bundle is *GEM Scan*, a desktop publishing program for integrating scanned images with text. *GEM Scan* provides TIF and .IMG output formats for use with *Ventura Publisher* and *PageMaker*.

The scanner, software, and IBM-compatible interface sell for \$2195. Pentax Technologies Corp., 800 Interlocken Pkwy., Broomfield, CO 80020; 303/460-1600. —Glenn Grant

Reader service no. 654

Ultra 16, LM-317

Pick a Pair

If you work in computer-aided engineering, manufacturing, or design, you want a monitor with high resolution. If you're in desktop publishing, you want to see as much of your page on screen as possible. Princeton Graphics has introduced new monitors that should satisfy both engineering and desktop publishing types, plus anyone who spends long hours in front of the tube.

For the engineer, designer, or architect, there's the Ultra 16, a 16-inch high-resolution color monitor that is compatible with every kind of graphics adapter up to and including IBM's extremely high-resolution (1024 by 768 pixels) 8514/A.

The Ultra 16 features autosynchronous horizontal and vertical scanning, which means that you can plug it into virtually any computer with any graphics card and go right to work. That includes classic PCs and IBM PS/2s equipped with MDA, CGA, EGA, VGA, Hercules, MCGA, or PGA graphics. The monitor automatically detects the type of board installed and locks on to its signal. Two types of cables are provided, one for analog systems (MCGA, VGA, PGA, and 8514/A) and one for digital (MDA, Hercules, CGA, and EGA).

In analog mode, the Ultra 16 offers up to 256 colors in VGA mode and 16 colors with an 8514/A, both from a palette of 262,144. These help add dimension and detail to graphic representations.

Autosizing eliminates that annoying black border around the image area, presenting a larger work space regardless of the program in use. A built-in tilt-and-swivel base, small footprint, color switch for text support, and black-matrix nonglare screen are standard. The suggested retail price is \$1375.

The LM-317 is a high-resolution, monochrome, landscape-mounted display ideal for desktop publishing and CAD applications. Basically a 17-inch vertical monitor flipped over on its side, it offers 1664 by 1200 resolution at 140 dpi for a high-precision image. Four gray levels allow you to display photographs and illustrations with maximum intensity and detail.

The LM-317 requires the right controller card, such as Princeton's PG-1600 (\$750), Sigma Design's LaserView Plus (\$995), or the Number Nine Pepper 1600 (\$1495). It allows side-by-side page viewing in programs such as *Microsoft Windows*,

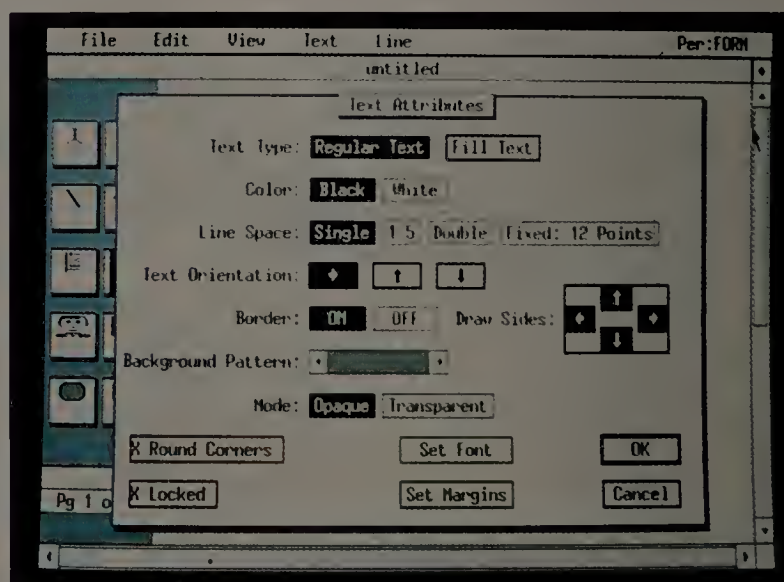
Ventura Publisher, *PageMaker*, *GEM* applications, and *AutoCAD*. Ergonomic details include a built-in tilt-and-swivel base and front-mounted, easy-access user controls. Suggested retail price is \$949. Princeton Graphics Systems, 601 Ewing St., Bldg. A, Princeton, NJ 08540; 800/221-1490, 609/683-1660. —Glenn Grant

Reader service no. 655

Per:Form

Function-Following Forms

In theory, desktop publishing programs are ideal for designing time cards, expense reports, and other business forms. In practice, a forms job like creating grids with variously shaded cells turns out to be a frustrating exercise in repetition. Vertical text, a common forms requirement, may be virtually impossible to achieve.



Build a form in the comfort of Per:Form's graphic user interface, taking advantage of tools that even a desktop publisher can't match.



A funny thing happens when you go around solving other people's database problems.

People tend to think of you as somebody you're not.

But that's all right. Because with all due respect to those who develop applications professionally, the fact is that more and more everyday people are being encouraged to turn out more

and more everyday programs.

Of course, it helps if they have a tool like dBASE IV's Applications Generator.

The dBASE IV™ Applications Generator does pretty much what its name implies: it writes the necessary code to pull together all the elements of your application. So you can concentrate more on what you want to accomplish, and less on what you have to do to get there.

The Applications Generator is fully integrated with dBASE IV's new Control Center, too. So you get a simple, understandable way to access all

this power. Be careful, though—this combination just might turn you into a programmer.

Which actually may not be so strange after all.

Want to see what it feels like? Just visit your local authorized Ashton-Tate dealer for a demonstration, or call **800-437-4329* ext. 2934** for details on videotapes, demo disks, upgrades, and more.

 **ASHTON · TATE®**
INTRODUCING dBASE IV

**“It's kind of strange,
really—all of a sudden people
think I'm a
programmer.”**



*In Colorado call (303) 799-4900. Trademark/owner: dBASE IV, Ashton-Tate, and Ashton-Tate Logo/Ashton-Tate Corporation. © 1989 Ashton-Tate Corporation. All rights reserved.

Per:Form software from Delrina Technology brings desktop publishing technology to forms processing with wrinkles that make it outperform generalized publishers. For instance, if you've ever used a desktop publishing package to create a grid of minuscule blocks for a time card, you'll appreciate the way *Per:Form* treats such an image as a single object rather than requiring that each tiny square be handled separately.

Per:Form uses the Digital Research *GEM* interface of drop-down menus, icons, and on-screen mouse pointers, so if you happen to use that or *Ventura Publisher*, your learning curve just got a lot flatter. *GEM* also means that Delrina's forms maker supports all major monitors, mice, and printers.

Per:Form comes in two modules. The design module is stocked with lines, rectangles, and rounded rectangles. If you want to dress up your forms, images can be either scanned and traced or imported from clip-art packages. Text typed in can be underlined and presented horizontally or vertically in multiple, downloadable fonts.

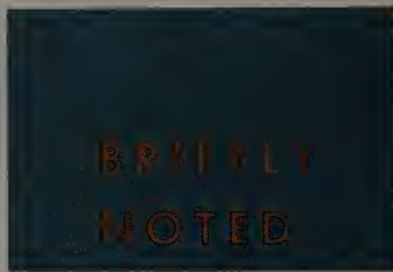
The fill module is a what-you-see-is-what-you-get data entry tool that operates independently, allowing form users to tab to fields and input data on their PCs. That means no more forms smeared with illegible scribbles—just clean printing, perfectly lined up. Your calculator may get dusty too, be-

cause *Per:Form* has a math function that automatically adds fields, subtracts a discount, figures sales tax, and fills in totals.

Per:Form is priced at \$259.95 and comes with run-time version of *GEM* and a 60-day guarantee. It requires DOS 2.1 or a later version and 640K of memory; a mouse is strongly recommended. Delrina will sell you a Mitsubishi mouse for \$39.95 with your order. Include proof of purchase of a character-based forms package and you get the mouse for free. Delrina Technology Inc., 4454 Genesee St., Buffalo, NY 14225; 800/268-6082.

—Mark Henricks

Reader service no. 656



Venture—The Entrepreneur's Handbook

Star Software has released *Venture—The Entrepreneur's Handbook*, a business software system designed to help emerging businesses plan for the future, analyze operations, and control their growth.

If you're involved in a business startup or one of the estimated 12 million existing small businesses, *Venture* can guide you through the development of a comprehensive plan to attract funding and act as a blueprint for sales and marketing strategies.



Build a comprehensive business plan with *Venture—The Entrepreneur's Handbook*; it's equipped with common business forms and financial statements, a word processor with mail merge and spell-checking capabilities, a spreadsheet, a file manager, and a double-entry general ledger.

Venture's interactive business planning module—developed by faculty at the University of Southern California Business School—steps you through the planning process with contextual prompts and helpful on-screen hints. The package includes common business forms and financial statements. More than two dozen templates allow you to analyze financial performance on an ongoing basis.

Additionally, the package integrates a word processor with mail merge, a spelling checker, a spreadsheet, a file manager, and a double-entry general ledger. Star also sells the low-priced *Accounting Partner Series* for other basic accounting functions such as accounts receivable and payable.

Venture employs Tandy's *DeskMate* environment for a consistent graphic interface complete with pulldown menus and mouse support in all modules. The *Desk-*

Mate clipboard facilitates the transfer of data across modules, and *Venture* imports and exports 1-2-3 and ASCII files.

Venture sells for \$349 with 30 days of free support. An additional year of support costs \$250. The software requires DOS 3.0 or a later version, 512K of memory, and a hard drive. Star Software Systems, 363 Van Ness Way, Torrance, CA 90501-1420; 800/242-7827. Reader service no. 657

Instant Image 5500

The Instant Image 5500 add-on board converts tape backup systems to automatic, nonstop operation. Consolink Corporation's user-installable board, software, and cables eliminate tedious manual backups by automatically capturing data on tape as it is saved to your main storage device. Alternatively, you can set the software to back up at given intervals.



It's always the raw speed of an application that seems to catch one's attention. But when you think about it, speed alone doesn't

always determine the amount of useful work you can produce.

That's why in dBASE IV,™ we added more than just a blazingly fast .EXE compiler. We added a total of 310 new or enhanced commands and

functions that help you complete your applications in less time than you ever thought possible.

And without your having to become a full-fledged programmer to do it.

Of course, the compiler by itself lets you run applications significantly faster than is possible with dBASE III PLUS.™ But you'll also find yourself working much more efficiently through dBASE IV's intuitive new Control Center. As well as by using its Applications Generator. Or the Report Writer. The Forms Generator. And much more.

After all, when it comes to developing dBASE IV applications more quickly, there's not just one way to do it.

There is one way to find out more, though. Just visit your local authorized Ashton-Tate dealer for a demonstration, or call 800-437-4329* ext. 2934 for details on videotapes, demo disks, upgrades, and more.

 **ASHTON · TATE®**
INTRODUCING dBASE IV

“Have you noticed that program speed is not the only reason you get things done faster?”



*In Colorado call (303) 799-4900. Trademark/owner: dBASE III PLUS, dBASE IV, Ashton-Tate, and Ashton-Tate Logo/Ashton-Tate Corporation. © 1989 Ashton-Tate Corporation. All rights reserved.

Circle 19 on reader service card

File Edit View Window Help
Look & Link menu

	A	B	C	D
For Year Ended December 31st	1986	1987	1988	
Sources of working capital				
Net income	\$276,977	\$692,894	\$798,408	
Net change to income:				
Deferred income taxes	\$93,872	(\$37,568)		
Depreciation and amortization	\$79,832	\$96,267	\$185,446	
Working capital from:				
Sale of fixed assets				
Issuance of common stock				
Issuance of preferred stock				
Total sources				
Uses of working capital:				
Payments to fixed assets				
Payments to other assets				
Dividends paid on capital				
Total uses				
Change in working capital				

Statement of Income 1988

	A	B
Income from operations	\$1,193,000	
Interest and dividends	\$76,400	
Income before income taxes	\$1,276,400	
Provision for income taxes	\$478,000	
Net income	\$798,408	
Earnings per share	\$1.10	

Struggle with gargantuan worksheets no more! Look & Link lets you store huge spreadsheets in manageable pieces and consolidate them later using its pop-up window.

Continuous automatic tape backup, as Consolink calls the technology, miniaturizes a convenience that's familiar to mainframe computer users. The Instant Image 5500 relies on a 5K memory-resident program to detect each time your system writes to disk and then route a copy of the information to a 128K RAM disk on the board. The buffer is dumped to tape only when full so that your system won't bog down with constant writing to tape. You also can order saves at intervals of 1 to 10 minutes.

Instant Image versions are offered for tape drives made by Emerald Systems, Everex, Genoa, and Maynard; subtle differences in the pin-out configurations require special cables for each manufacturer's drives.

Consolink prices the add-in at \$599. Consolink Corp., 1840 Industrial Circle, Longmont, CO 80501; 303/651-2014. Reader service no. 658

NetWare SQL

NetWare SQL is an ANSI-compatible Structured Query Language engine optimized for Novell's well-established *NetWare* network system software. Tightly integrated into the system software, *NetWare SQL* offers a framework that lets local area network users select the front-end interface they want—be it a data base, a spreadsheet, or a word processor—while the back-end SQL engine offers quick access to a common data base.

NetWare SQL not only provides the transaction and user-access security protocols of industry-standard SQL but also the standard *NetWare* passwords and privileges. It comes with backup utilities, fault tolerance through *System Fault Tolerance (SFT) NetWare*, and Novell XQL data base facilities for software developers, including multiple language interfaces and support for a wide range of data types.

Borland International and WordTech Systems are among the companies

that have announced plans to support *NetWare SQL*. The software, which sells for \$595 per server, requires DOS 3.1 or a later version and at least 2MB of memory on the server and 512K on the workstations. Novell Inc., 122 E. 1700 S, Provo, UT 84601; 801/379-5900.

Reader service no. 659

NetWare SNA Gateway, NetWare 3270 LAN Workstation

Novell is shipping enhancements to its *NetWare* operating system that support improved gateways between Novell local area networks, wide area networks, and large systems.

NetWare SNA Gateway lets up to 97 workstations on a *NetWare* net communicate with an IBM or compatible host computer via token ring, remote, remote-assist, coax-multiplexer, or coax connectivity options. *NetWare SNA Gateway ELS* is an entry-level version for low-end *NetWare ELS* nets that offers connectivity at a lower price for up to 5 net workstations.

The software comes with a Quick-Start guide, a menu-driven customization program for quick installation, and self-test and diagnostic management tools. Novell claims to have solved many of *NetWare*'s performance and connectivity snafus, such as breakdowns under heavy traffic, that have made LAN managers re-

luctant to use SNA gateways in the past.

NetWare SNA Gateway sells for \$2995 for an unlimited server-based license, and *NetWare SNA Gateway ELS* sells for \$595. Both are compatible with *Advanced* and *SFT NetWare* version 2.1 and *ELS NetWare Level II* version 2.1 and run on Token-Ring, Ethernet, and other NetBIOS-compatible nets.

Both offerings require *NetWare 3270 LAN Workstation*, which provides PC terminal emulation and communicates with the mainframe host via a Novell SPX or NetBIOS connection. The 3270 software is bundled with Novell's SFT fault-tolerance network system software and is available with a server-based license for \$995.

NetWare SNA Gateway requires 230K to 370K of memory, while *ELS* requires 232K. Each workstation should have 640K. DOS 3.1 or a later version is required for each workstation and server. Novell Inc., 122 E. 1700 S, Provo, UT 84601; 801/379-5900.

Reader service no. 660

@WSLink, Look & Link

If your worksheets are straining your system's memory limits, a pair of new 1-2-3 add-ins will help break those memory killers into multiple worksheets that will be easier on both your computer's memory and yours.

Goldata Computer Services' @WSLink is the simpler and less expensive of the two. For only 19K of memory and \$49.95, you

IT TAKES GENIUS TO MAKE POWER PERFORM LIKE THIS.



BEAUTY, GRACE, CLASS

— the fine art of creating micro-computers so powerful you'll want to applaud their genius.

● The people at PC Designs engineer high-quality, high-performance equipment that is leaving the competition flat-footed. And their **S**ervice and **S**upport, including SorbusSM maintenance contracts, are without equal. ● Everything done by PC Designs is done with class and innovation. Consider their new GV386PLUS as just one premier example — **S**peed, **E**xpandability, and **M**emory configurations. And a price that will leave you room for shopping for their other options, such as high-powered hard disks and printers. ● When you need to take that **N**ext **S**tep in computerization, call PC Designs. They're the people who know how to make power perform.

**PUTTING THE POWER
IN YOUR HANDS**

MICRO 286 — \$985.

- 80286, 10MHz
- 512KB, zero wait-state
- 1 serial, 1 parallel port
- 1.2MB or 720KB floppy drive
- 101-key keyboard

GV 286* — \$1299.

- 80286, 12MHz
- 512KB, zero wait-state
- 32KB RAM cache
- 2 serial, 1 parallel port
- 1.2MB or 720KB floppy drive
- 101-key keyboard

*PC Magazine's "Editor's Choice" on October 13, 1987. Ranked #1 in PC Week's Poll of Corporate Satisfaction, October 17, 1988.

GV 386/16 PLUS — \$2399.*

- 80386, 16MHz
- 1MB, zero wait-state
- 64KB RAM cache
- 2 serial, 1 parallel port
- 1.2MB or 720KB floppy drive
- WEITEK & 80387 support
- Up to 16MB of 32 bit memory

*FCC approval pending.

GV 386/20 PLUS — \$2799.*

- 80386, 20MHz
- 1MB, zero wait-state
- 64KB RAM cache
- 2 serial, 1 parallel port
- 1.2MB or 720KB floppy drive
- WEITEK & 80387 support
- Up to 16MB of 32 bit memory

*FCC approval pending

VIDEO

- Mono card and monitor — \$175.
- EGA card and monitor — \$589.
- VGA card and NEC MultiSync II — \$909.

HARD DISKS

- Priam ID45H (45MB, 28MS) — \$489.
- Priam ID62 (70MB, 28MS) — \$659.
- Priam ID130 (160MB, 28MS) — \$1425.
- Maxtor AT140 (140MB, ESDI, 11MS) — \$1799.



NOVELL®

SorbusSM
A Bell Atlantic Company

HOURS — 8:00-6:00 CST, Monday-Friday
9:00-3:00 CST, Saturday

CALL US AT — 1-918-251-5550 (in Oklahoma)
1-918-251-7057 (Fax)

BBS ON-LINE 24 HRS — 1-918-252-9137

All prices are subject to change without notice.

PC Designs

2500 N. Hemlock Circle • Broken Arrow, OK 74012
(on 61st, west of 145th E. Ave.)

**CALL US AT
1-800-322-4872**

(outside Oklahoma)

Circle 350 on reader service card

can link cell values dynamically between multiple worksheets, and the program will automatically update selected cells in an unlimited number of worksheets on a network as well. Goldata Computer Services Inc., 2 Bryn Mawr Ave., Bryn Mawr, PA 19010; 800/432-3267.

Reader service no. 661

At \$99.95, *Look & Link* from Personics Corporation has the same dynamic linking plus more features and the ability to consolidate several worksheets into one. Summing a year's worth of monthly profit-and-loss statements to produce an annual is

just one of the many chores *Look & Link* makes much easier.

Whether you're consolidating or linking, you'll need to know what you're working with. That's where *Look & Link* shines. It gives you a hot key that calls up a second worksheet inside a pop-up window. You can scroll across or up and down, resize the window, and even cut and paste, making child's play of the otherwise tricky task of deciding which cells to link. Personics, 63 Great Rd., Maynard, MA 01754; 508/897-1575.

Reader service no. 662



IBM Token-Ring Network 16/4 Adapter, 16/4 Adapter/A, Token-Ring Network Bridge Program 2.1

IBM has introduced a new version of its Token-Ring Network, with adapters and software that enable the net to run at 4 or 16 Mbps, up to four times as fast as IBM's existing Token-Ring offerings.

The 16/4 Adapter for AT-bus machines and its Micro Channel version, the 16/4 Adapter/A, are built around a CMOS chip

that integrates functions formerly performed by six chips in a half-card package. The adapters have 64K of memory on board, compared with a maximum of 16K for earlier LAN models, boosting performance through larger data frames and handling more concurrent sessions on a server. The adapters support frames of up to 18K on 16-Mbps rings and up to 4.5K on 4-Mbps rings, compared with the previous limit of 2K. You can send larger files faster between workstations, facilitating transfers across wide area nets and to mainframes and minis.

The new products also boost throughput with an "early token release" technique, which lets a workstation transmit its token immediately after sending a frame of data, rather than waiting for the frame to return. More than one token can operate on the net at a time, achieving operating efficiencies of up to 95 percent, claims IBM.

While the new cards can run at either 4 or 16 Mbps, they cannot do so simultaneously, nor can speeds be mixed on the same Token-Ring. But you can connect Token-Rings of different speeds through a gateway that's equipped with both adapter cards and is running IBM's *Token-Ring Network Bridge Program* version 2.1, which forms multiple physical rings into a single logical ring. The 16/4 Adapter/A permits you to change speeds through software, while the 16/4 Adapter requires the use of switches.

Unlike 4-Mbps Token-Rings, which can operate on unshielded cabling, 16-Mbps nets require more expensive shielded cabling.

Both the 16/4 Adapter and 16/4 Adapter/A retail for \$895. IBM also enhanced and repriced its existing 4-Mbps products; an upgraded 4-Mbps MCA adapter is available for \$750, while an AT-bus version sells for \$650. IBM, U.S. Marketing & Services Group, 900 King St., Rye Brook, NY 10573; 800/426-2468.

Reader service no. 666

Crosstalk XVI 3.7, Crosstalk Mk.4 1.1

Crosstalk Communications has added background communications to *Crosstalk XVI*, letting version 3.7 transfer or download files without interrupting your foreground computing tasks.

Crosstalk Mk.4 version 1.1 gains compatibility with additional terminals, device drivers, and transmission protocols—including IBM NETBIOS, Novell NASI device drivers, and Hayes FAST transmission protocols. It also includes an on-board programming language, CASL, for advanced communications scripting.

Retail prices for *Crosstalk XVI* and *Crosstalk Mk.4* remain \$195 and \$245, respectively. Requirements include DOS 2.0 or a later version, 128K of memory for *Crosstalk XVI*, and 320K for *Crosstalk Mk.4*. Upgrades are available from Crosstalk for nominal fees. Digital Communications Associates, Inc., 1000 Holcomb Woods Pkwy., Roswell, GA 30076; 404/998-3998.

Reader service no. 667

Mirror III

SoftKlone has released *Mirror III*, an update of its *Crosstalk XVI* clone, *Mirror II*. The latest version includes a new scripting language, PRISM (Programmable Integrated Scripts for Mirror), with programming routines that enable you to design custom interfaces, perform arithmetic functions, or parse data

NOW SPEND LESS TIME KEEPING YOUR BOOKS — AND MORE TIME BUILDING YOUR BUSINESS.

Introducing Andrew Tobias' Checkwrite Plus™: Check to ledger to budget to tax category — in a keystroke.

"I spend too much time on bookkeeping!" That's the complaint we hear again and again from managers of growing businesses. And the reason we're introducing Andrew Tobias' Checkwrite Plus.

Checkwrite Plus makes check writing and bookkeeping faster and easier

When you write a check or receive income, your checkbook balance automatically knows, your budget automatically knows, your cash flow projection automatically knows, and the transaction is recorded in the proper tax category — all in a keystroke!

You can print a month's worth of checks in seconds and balance your checkbook in a breeze.

You can recall transactions by date, check number, amount, or payee — in about as much time as it takes to read this sentence.

You can manage your accounts payable and receivable, track and analyze loans, even print amortization schedules.

And with your financial data base at your fingertips, you can monitor and print essential reports like budget vs. actual spending, P&L, cash flow, and more — faster and easier than ever before.

More time to build your business

Checkwrite Plus brings your financial routine under time-efficient control. It pinpoints spending trends (and areas where you're overspending) which would take forever to uncover by studying your checkbook.

It gets you ready for your accountant (and saves you money on accounting time charges). But most important of all, Checkwrite Plus gives you more time to do the things you need to do in order to build your business.

Time-saving features

the competition can't match

Only Checkwrite Plus is written by financial expert Andrew Tobias, whose make-it-simple style gets you started fast. (You won't even need the manual.)

Checkwrite Plus performs more bookkeeping functions than other check writing programs. It can handle multiple bank accounts, print invoices, and handle credit cards, unlike the leading competition.

Checkwrite Plus performs bookkeeping functions more thoroughly than other programs. You get income and expenses by tax category — not just a list. You get more complete budgeting and cash forecasting, and better graphics. Reports are a whole lot easier to create.

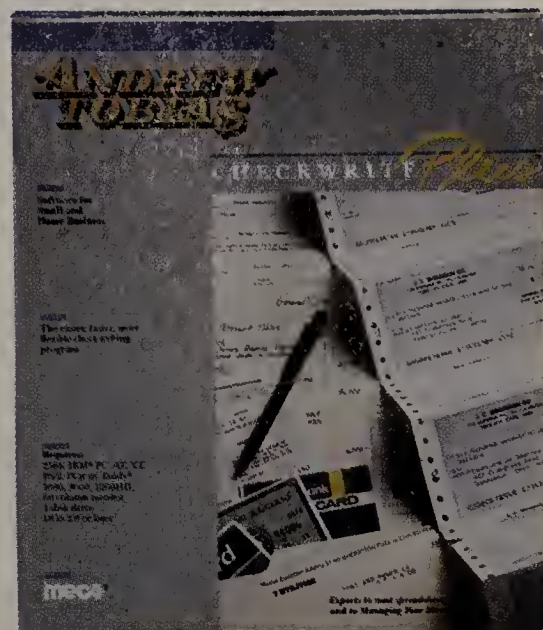
Checkwrite Plus is more flexible. You can quickly **customize** the program to meet your needs, right down to the check layout. (Our leading competitor locks you into his check layout.)

Want to export data to 1-2-3? It's free and easy with Checkwrite Plus. (The other guys charge extra for a transfer utility.)

And Checkwrite Plus easily exports to Andrew Tobias' **Managing Your Money**. (It's always nice to know that you can trade up to more comprehensive software without having to re-enter all your data.)

For Business People Who Write Checks

If you manage a small business, are an independent contractor, a consultant, doctor, property manager, or accountant, Checkwrite Plus will prove a valuable tool that frees your time. Its speed and simplicity make it great for personal use too.



Introductory Offer

For a limited time you can purchase Checkwrite Plus for only \$49.95. That's \$20.00 off the regular price of \$69.95. Act now! Offer expires Jan. 31, 1989.

Money Back Guarantee

If Checkwrite Plus does not make your check writing and bookkeeping faster and easier, return it to us within thirty days for a full refund.

See your dealer

or call Toll-Free to order:

1-800-835-2246 ext. 12

...or mail the coupon today.

Requires:

256K IBM® PC, AT, XT, PS/2, PCjr or Tandy® 1000, 3000, 1200HD • 80 column monitor • 1 disk drive • DOS 2.0 or later
Not copy protected.

PCW	
SEND TO: MECA VENTURES, INC. 355 RIVERSIDE AVENUE WESTPORT, CT 06880	
1-800-835-2246 x.12	
THIS IS THE ORDER OF	+ \$2.50 shipping & handling \$49.95
Name	
Address	
City	State Zip Phone
Credit card # (V, MC, AMX)	exp. ☐ 5/14" ☐ 31/2"
YES, I want to spend less time on bookkeeping and have more time to build my business! Send me Checkwrite Plus at the special introductory price of \$49.95 + \$2.50 shipping & handling. CT residents add \$3.75 sales tax.	
MEMO: Allow 4-6 weeks for delivery. Offer expires 1/31/89.	
Signature required	

meca®

© 1988 • MECA

355 RIVERSIDE AVENUE, WESTPORT, CT 06880

Circle 239 on reader service card

	A	B	C	D	E	F	G	H
1	CLOSING PRICE HISTORY SINCE 8/26/88							
2	DATE	AT&T	FED X	GM	HILTON	DELTA	FLOWERS	JNSM&JNSM
3	8/26/88	25.00	43.25	72.00	44.50	47.37	16.87	80.87
4	8/29/88	25.12	44.00	72.62	45.50	47.87	17.00	81.25
5	8/30/88							0.75
6	8/31/88							1.00
7	9/01/88							0.50
8	9/02/88							2.00
9	9/05/88							3.25
10	9/07/88							4.37
11	9/08/88							4.50
12	9/09/88	25.50	45.50	73.25	44.62	48.87	18.37	84.00
13	09/12/88	25.12	45.12	74.12	44.37	48.50	18.25	83.87
14	09/13/88	25.12	45.12	74.62	44.37	48.25	18.37	83.50
15	09/14/88							
16								
17								
18								
19								
20								

Connected to Dow Jones News Retrieval

Ready to begin importing today's closing stock prices

Press Alt-I to begin Importing, Alt-C to Cancel

816 (F2)

Help Edit Name Tabs Goto Window Data Stable Recalculate Graph
63K 13:30

Crosstalk XVI-clone Mirror III includes a scripting language with programming routines that enable you to design custom interfaces, perform arithmetic functions, or parse data from remote sites.

from remote sites. When combined with *Mirror III*'s background mode, PRISM allows you to retrieve data in the background and pass it directly to a foreground application by hot-keying between the two.

Mirror III also ships with ACT Software's *CommPressor* data compression and error detection/correction software, which increases file transfer speed up to 2.5 times and saves transmission costs when both PCs are running *Mirror III* or *ACT*. *Mirror III* also gains certain DOS file functions such as COPY and RENAME, a dialing directory, and additional protocol support. It sells for \$99.95 and requires DOS 2.0 or a later version and 512K of memory. SoftKlone, 327 Office Plaza Dr. #100, Tallahassee, FL 32301; 904/878-8564. **Reader service no. 668**

Disk Technician Advanced

Prime Solutions offers a new version of its disk maintenance software

with approximately 40 enhanced features. *Disk Technician Advanced* optimizes hard disk performance through a variety of techniques, including finding the optimum setting for a hard drive's interleave and performing a low-level reformat without destroying existing files or drive partitions.

Disk Technician Advanced, which supports two physical hard drives and runs from one of those drives or a floppy, also provides automatic system, data, and file allocation table (FAT) recovery for systems that have crashed.

The program is equipped with artificial intelligence-based pattern recognition that looks for telltale hard drive problems, while its expert system determines appropriate testing and repair routines. A data base stores test results even for intermittent, single-bit errors, providing the system with all the data that it needs for diagnosis.

Disk Technician Advanced applies its propri-

etary testing algorithms to every location on the drive, occupied or not, removing and temporarily storing in RAM data from tracks being tested. If an error is found, the track is reformatted and retested and the data redeposited. Areas that can't be repaired are mapped out, and the data is repositioned in a safe location. The package will not address disk partitions larger than 32MB.

Disk Technician Advanced features an improved version of Prime's RAM-resident *SafePark* head-parking program. It retails for \$189.95 and requires 512K of memory and DOS 2.1 or a later version. Registered owners of *Disk Technician* and *Disk Technician +* can upgrade for \$69.95. Prime Solutions, Inc., 1940 Garnet Ave., San Diego, CA 92109; 619/274-5000.

Reader service no. 669

Complete Statistical System 2.1

Version 2.1 of StatSoft's *CSS (Complete Statistical System)* includes four new statistical modules and numerous enhancements to current modules. The quality-control-analysis module offers flexible implementations of a wide variety of statistical charts, including Pareto and regression-control types. The canonical-correlation module analyzes canonical designs of up to 100 variables. The survival- and failure-time-analysis module employs comprehensive techniques for analyzing social and medi-

cal research data. Finally, a function called distribution fitting automatically computes incremental fit when model parameters are added or deleted.

The package includes its own integrated programming language, *CSS:Pascal*, which supports recursive function calls, multiple-loop counters, and specialized statistical functions. *CSS:Pascal* comes with an integrated editing/debugging environment and lets you perform statistical data transformations for uses such as Monte Carlo simulations and data base management.

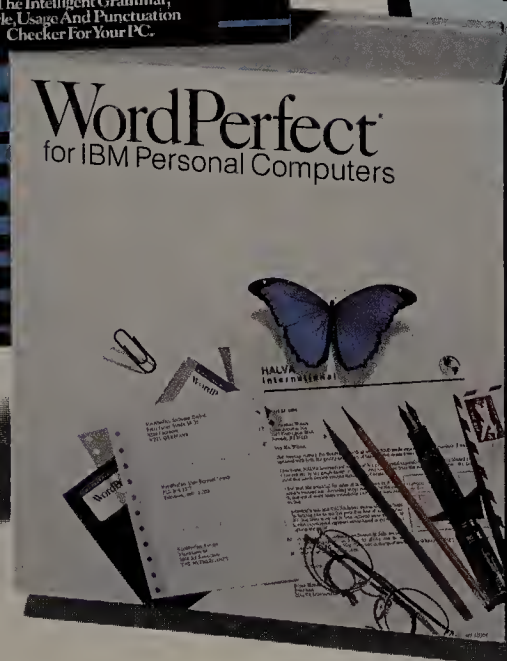
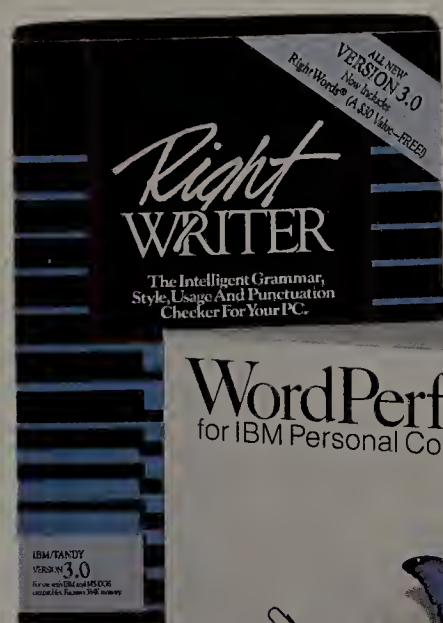
CSS includes a built-in presentation-quality graphics system, *CSS:Intergraph*, that is fully integrated with all modules. Creating a graph from your statistics is as easy as pointing to the numbers to be included on the screen and choosing the graph type. For example, select a correlation coefficient and its scatterplot will appear. You can customize the colors on the screen for each module.

The price of *CSS* remains \$495. Owners of current versions can upgrade for \$90. StatSoft, Inc., 2325 E. 13th St., Tulsa, OK 74104; 918/583-4149.

Reader service no. 671

Glenn Grant is a freelancer based in San Diego, and Mark Henricks is a PC World contributing editor.

WORDPERFECT GIVES YOU THE POWER. RIGHTWRITER GIVES YOU THE CLARITY.



Now Run
RightWriter
From *Within*
WordPerfect!

RightWriter Checks The Grammar, Style, Usage And Punctuation In Your Business Writing.

RightWriter 3.0 helps you produce clear, powerful business writing. Not a spelling checker—RightWriter is a sophisticated expert system for checking errors in grammar, style, usage and punctuation.

- ✓ **Easy To Use**—Just a two-key sequence—WordPerfect® does the rest. PLUS—expanded on-line help!
- ✓ **Recommendations** are inserted into your text to point out problem areas.
- ✓ **Graphical Indexes** measure the strength, readability, and other overall qualities of your writing.
- ✓ **New Menu System** allows you to change RightWriter to meet your specific needs.
- ✓ **Recommends, Never Decides.** RightWriter is a writing aid; the final decision is always yours.
- ✓ **Includes RightWords® FREE!** A \$30 value—quickly customize RightWriter's vocabulary to fit your needs.
- ✓ **For use on IBM PC, PC/AT, PS/2 and compatibles.**

And now RightWriter can be used *from within WordPerfect 5.0!*—A full document analysis can be done with just a *two key sequence* without exiting to DOS.

With a rule base of over 4,000, RightWriter is the one writing tool you shouldn't be without. It's faster, more powerful—and now more convenient for WordPerfect users.

RightSoft, Inc. 4545 Samuel Street,
Sarasota, Florida 34233

See your dealer or order direct...

(800) 992-0244 Or (813) 923-0233

TELEX: 91-03509862

FAX: (813) 921-7849

All New!
VERSION
3.0

We Offer A 30-Day Money-Back
Guarantee On Direct Orders.

Still Just \$95.



Call us for upgrade information.

VISA, MasterCard & AMEX accepted. Add \$4.50 for shipping. FL residents add 6% sales tax. International orders add \$15. We offer a 30-day money-back guarantee on direct orders.

Copyright 1988, RightSoft, Inc. RightWriter is a registered trademark of RightSoft, Inc. RightWriter® is a RightSoft product.

Is dBASE IV Worth the Wait?

**dBASE IV fulfills enough
promises to keep a horde of
dBASE clones off balance.**

**But some users may balk at its
halfhearted SQL implementation
and mediocre performance.**

The long-awaited *dBASE IV* may be a catch-up product in the rapidly evolving world of programmable data managers, but it doesn't feel that way. With a few exceptions, the additions are thoughtfully implemented and smoothly integrated, putting the program slightly ahead of such rivals as *Paradox* and *R:base*. Yet *dBASE IV*'s reign may be fleeting. Although light-years ahead of *dBASE III Plus*, it fails to deliver a knockout punch, and competitors are busy preparing advanced versions of their products.

Still, Ashton-Tate has given dBASE programmers what they asked for: the best application programming environment on the market. A new pseudocompiler, a menu-driven application generator that beats *R:base*'s Application Express system, a text editor and animated debugger, and additions to the dBASE command language should help stem the exodus to *Clipper*, *Quicksilver*, and *Foxbase +*. Most nonprogrammers will be pleased also. Although a bit of a stretch for

novices, the menu-driven Control Center offers access to almost every facet of the program, including excellent new reporting and forms-creation modules and a welcome new query-by-example (QBE) capability.

As National Software Testing Laboratories (NSTL) benchmarks reveal, however, *dBASE* is still no speed demon. Although *dBASE IV* is two to three times faster than *dBASE III Plus* at nonreporting tasks, *Foxbase + 2.1* is 15 to 25 percent faster at straight indexing and updating jobs than *IV* and 37 to 42 percent faster at updating with an index. When it comes to reporting, *dBASE IV* is positively ponderous—vastly slower than *Foxbase +* and about three times pokier than *III Plus*.

dBASE IV's implementation of Structured Query Language (SQL) is also disappointing. Designed for querying mini and mainframe data bases, SQL was tacked on to *dBASE IV* to please Fortune 500 and government customers. The rough edges show. Performance suffers due to internal translations from SQL to dBASE equivalents and the pairing of .DBF files with special SQL catalog files.

**William
Urschel**

Fortunately, Ashton-Tate and Microsoft will soon jointly release *SQL Server*, a new dBASE engine with true relational talents. The \$2495 package will act as a LAN-based processor that works with a SQL front end built into version 1.1 of *dBASE IV*. Both products are due in mid-1989, and the 1.1 upgrade will be free.

The Price and the Power

If *dBASE IV* sounds good, dig deep into your wallet. You won't have to convert *dBASE III Plus* files and programs, but you will need more RAM (640K versus 384K) and about 3.5MB of disk space. The price has jumped \$100 to \$795, and the upgrade costs a hefty \$175—\$30 if you bought *dBASE III Plus* after February 17, 1988.

dBASE IV is remarkably light on bugs—a welcome change from previous *dBASE* debuts. One serious glitch is the new help system, which sometimes gobbles up memory and freezes the system. Once repaired, this task-oriented, context-sensitive helpmate should be a winner.

More crucial to *dBASE IV*'s success is the Control Center, an integrated menu system that not only guides you through data entry (the old Assistant's major claim to fame) but offers quick access to all major functions. Instead of a point-and-shoot 1-2-3-like menu system, the screen displays the six categories representing the "objects" that make up any data base—data, queries, forms, reports, labels, and applications. When you open a data base, the Control Center displays a catalog of all associated files, which you can access immediately. To modify a label or run a report, for example, simply select the appropriate object, and up pops a menu. If you're familiar with *dBASE*—you don't mind memorizing a passel of keystroke combinations—you can quickly create and



link all the elements of an application. Novices, however, will probably long for a traditional menu structure.

QBE the dBASE Way

Another feature that puts *dBASE IV*'s power in the hands of the average user is its QBE mode, a technique popularized by *Paradox*. Instead of typing a string of convoluted commands at a dot prompt to sift data, you simply fill out a table with the necessary fields and operators. You can use QBE to draw fields from as many as eight files for a single form or report. An update query lets you add, delete, or modify data, but in only one file at a time.

FEATURES EVALUATION

dBASE IV Pulls Even With the Competition

dBASE IV shows dramatic improvement over dBASE III Plus, especially in reporting and application development.

	Paradox 2.0	dBASE IV 1.0	dBASE III Plus	R:base for DOS 2.1.1	Foxbase+ 2.10
● Yes ○ No ⊖ Deficient △ Limited only by available disk space					
Data entry and validation					
Command and menu driven	●	●	●	●	●
Forms per file	15	△	△	△	△
Lines per form	330	32,000	250	115	△
Validates via lookup table	●	●	⊖ ¹	●	⊖ ¹
Range checking	●	●	●	●	●
Checks duplicate index keys	●	●	○	●	⊖ ¹
Time checking	⊖ ¹	●	○	●	⊖ ¹
Development tools					
Application generator	●	●	●	●	●
User-defined functions	●	● ²	○	○	●
Macros	●	●	○	●	●
Animated debugger	●	●	○	○	○
Built-in compiler	○	● ³	○	○	●
File handling and searching					
One-to-many relationships	○	●	○	●	●
Many-to-one relationships	●	●	○	●	●
Many-to-many relationships	○	○	○	●	●
Updates multiple files from one form	○	⊖ ¹	⊖ ¹	●	●
Self joins	●	●	○	●	○
SQL queries	○	●	○	●	○
Rollback command	n/a	●	n/a	○	n/a
Queries by example or form	●	●	○	●	●
Reporting					
Multifile reports	○	●	○	●	●
Saves report source code	n/a	●	○	○	●
Headers allowed	●	●	○	●	●
Footers allowed	●	●	○	●	○
Summary reports	●	●	○	●	●
Mailing labels	●	● ⁴	●	● ⁵	●

	Paradox 2.0	dBASE IV 1.0	dBASE III Plus	R:base for DOS 2.1.1	Foxbase+ 2.10
Capacity					
File size (in records)	2 billion	1 billion ⁶	1 billion ⁶	2 billion	1 billion
Fields per record	255	255	128	800	128
Characters per record	4000	4000	4000	4096	4096
Tables per data base	△	△ ⁷	△	80	△
Indexes per file	255	47	7	80	7
Fields per index	255	100	100	800 ⁸	37 ⁹
Tables per join	△	8	8	5	10
Maximum number of open data files	△	10	10	80	10
Maximum number of memory variables	△	15,000	256	△	3600
Two-dimensional arrays	○	●	○	○	●
Reads/writes DIF	●	●	●	●	○
EMS support	●	○	○	○	●
Data encryption	●	●	● ¹⁰	○	○

¹ Only via a command file.

² Cannot include macros and approximately 47 dBASE commands.

³ Saves format as object file only, not as source code.

⁴ Locks postal presorting and merge/purge.

⁵ Via a supplied R:base program.

⁶ Or 2 billion bytes.

⁷ Via command prompt (the Control Center allows only 200 files per file type).

⁸ Fields are individually tagged as key fields; every field can be a key field.

⁹ Variable, based on field lengths.

¹⁰ In multiuser mode only.

dBASE IV's QBE roughly matches the power of Paradox 2.0's and in some ways is easier to use. For example, to link two tables in dBASE IV, simply select them from a menu, and dBASE provides the linking example. Unlike Paradox, dBASE IV saves disk space by storing queries as small pro-

grams that can rebuild a view on the fly. However, Paradox will find the fastest way to do the query; with dBASE IV, the order in which you present a multitable query may greatly affect search speed.

Friendly Forms and Reports

Kiss the @Say command good-bye. With *dBASE IV*, you can create custom data entry forms and reports from within the Control Center without ever resorting to command language. Yet unlike with *Paradox* and *R:base*, source code is generated for all forms and reports and can be included and modified for *dBASE* programs.

To create a custom form, you select fields from menus and arrange them on screen. You can draw lines and boxes, control screen color, and specify error messages and lookup and range verifications. You can search, append, or replace memo fields and display them in a separate window.

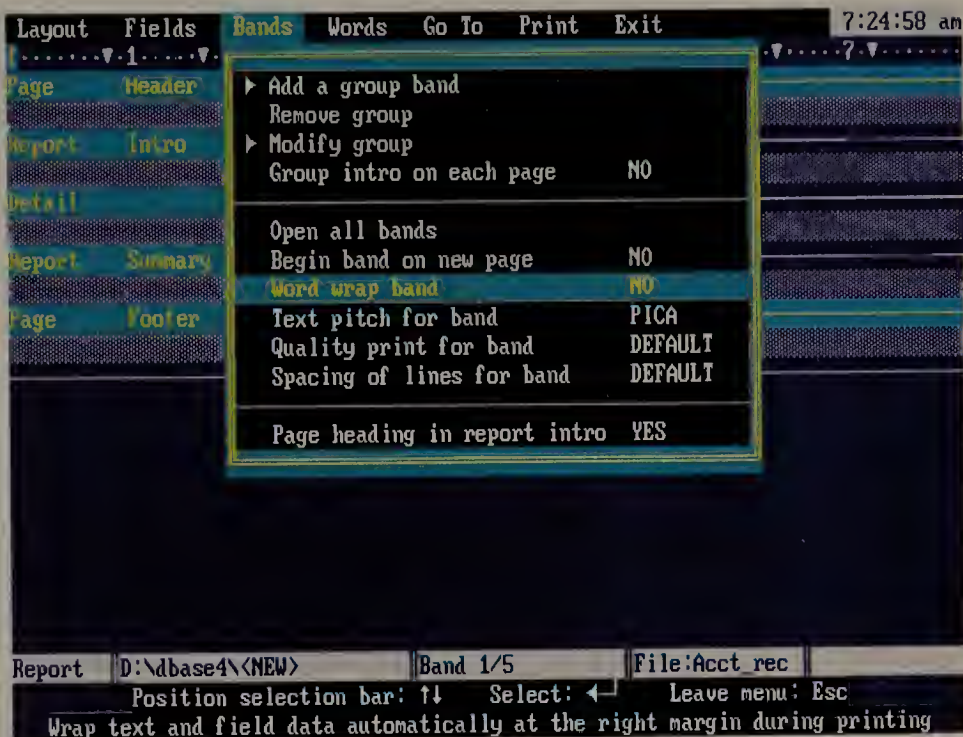
If you can live with its foot-dragging pace, you'll find *dBASE IV*'s report writer equal to any in the business. Like *Paradox*, *dBASE IV* adopts the *band* concept, in which horizontal rectangles on the page control the format of related report elements. And thanks to an improved set of printer drivers borrowed from *Framework*, you enjoy extensive control over fonts, attributes, lines, and boxes. The program also includes four canned formats that produce tabular reports, record-by-record forms, data files, and mail merge reports. They're all customizable, and a handy Quick Layout option pours data into the proper bands automatically.

Programmer's Delight

dBASE IV's collection of built-in programming aids and tools can't be beat. The language includes 240 new commands and functions, most notably, math and financial functions, expanded date and currency formats, two-dimensional arrays, and a floating-point data type that eliminates most rounding errors. The new user-defined functions are welcome but limited, prohibiting macros and about 100 *dBASE* commands.

dBASE IV's text editor shows numerous improvements. It's fast and includes block move, word wrap, and search-and-replace functions. Lines can be 1024 characters long, and file size is now limited only by disk space.

More important, the Applications Generator (ApGen) is finally complete. Although ApGen doesn't paint the footprints on the dance floor like *R:base*'s Application Ex-



press, it's more powerful. As with Express, you can use menus to generate elements such as interrelated data bases, screens, reports, and programs, but ApGen also lets you link elements together into a running application. In addition, you can add custom sign-on screens, define colors and windows, create custom help systems, and take your pick of menu types. If all you need is a quick single-menu program that edits a file or prints a label or report format, an easy Quick Application option spits out what you need in seconds.

Another big boost is an animated debugger that takes its cue from Microsoft's Code-view. As an application runs, the debugger highlights each line of source code as it executes. You can set breakpoints that control execution, monitor the value of variables and fields, and automatically flip a program into the debugger when a run-time error occurs.

Another welcome improvement is a *Fox-base*-like pseudocompiler that tosses off speedy binary object files. Unfortunately, it runs only when *dBASE IV* is loaded. If you want the real McCoy, you'll have to wait for an upcoming .EXE compiler that should be available as an upgrade to the new *dBASE IV Developer's Edition*. This \$1295 package also includes a royalty-free run-time module, a template language, multiuser testing tools, a linker, drivers, and *dBASE IV*. An extra \$89.95 buys *StepIVward*, a utility that con-

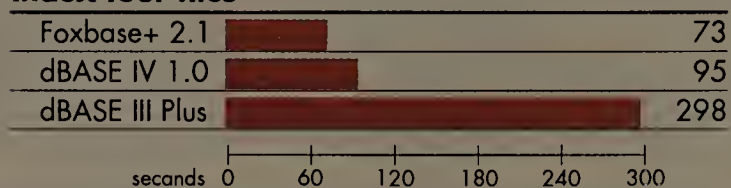
***dBASE IV*'s menu-driven report generator may be the best in the business. As with *Paradox*, reports are separated into different bands for easier creation.**

NSTL TEST REPORT

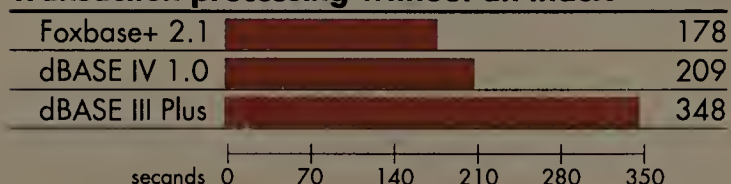
dBASE IV Speeds Up, but Still Lags Behind

dBASE IV is over twice as fast as dBASE III Plus at most tasks, but falls behind at reporting—and Foxbase still soars ahead.

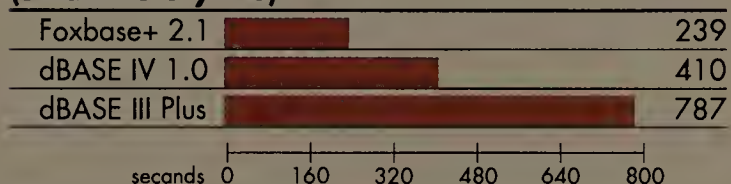
Index four files



Transaction processing without an index



Transaction processing with an index (small history file)



All tests were conducted using a 20-MHz Compaq 386 with 1MB of RAM, a disk cache of 256K, and a 130MB ESDI hard disk.

NSTL used a modified version of TP1, a standard developed out of a real-world situation in which a retail bank wanted to create a system with 10 million accounts, 10,000 tellers, and 1000 branches. The standard unit of transaction selected was debit/credit.

Index four files

This benchmark measured the time required to index four files: Account (50,000 records), Teller (1000 records), Branch (100 records), and Transact (1000 records).

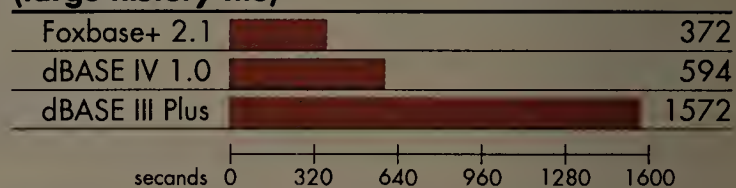
Transaction processing without an index

The TP1 benchmark was run with 1000 transactions. The history file was not indexed for this benchmark.

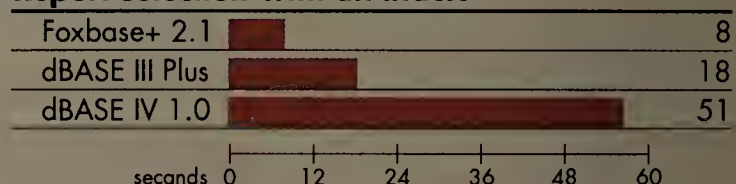
Transaction processing with an index (small history file)

The TP1 benchmark was run with 1000 transactions. The history file held 1000 records before the test was run and therefore ended up with 2000 records. The difference between this and the previous benchmark is that this benchmark used a history file indexed on four fields. Therefore an update of the index was required for each appended record. Compare these results to

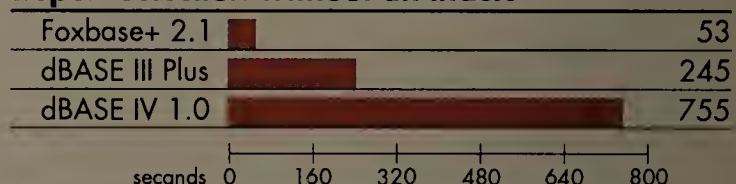
Transaction processing with an index (large history file)



Report selection with an index



Report selection without an index



the previous benchmark's to gauge the effect of updating the index during transaction processing.

Transaction processing with an index (large history file)

The history file from the previous test was expanded from 2000 to 10,000 records, and then the TP1 benchmark was run with 1000 transactions. The history file therefore ended up with 11,000 records. Updating of the index during transaction processing took longer. Compare these results to the previous two benchmarks' to gauge the difference between updating a small index file during transaction processing and updating a large index file during transaction processing.

Report selection with an index

This benchmark reported 1000 records from the account file in index order. Selection criteria were based on an index.

Report selection without an index

This benchmark repeated the previous report-selection test with selection criteria not based on an index.

Data based on tests designed and conducted by National Software Testing Laboratories (NSTL). All rights reserved.

verts Clipper, Foxbase+, and Quicksilver applications to dBASE IV.

Still Waiting for SQL

With the SQL race in full swing, Ashton-Tate had little choice but to offer its own version, based on IBM's DB2. Unfortunately, dBASE IV's SQL implementation is rather crude. You can't send SQL queries from the Control Center, you can't use QBE, and mod-

ifying some data structures is impossible. More important, execution is sluggish.

Getting at SQL's power takes some doing. For example, you have to choose between using pure dBASE, which allows you to get at most SQL tables, or dBASE/SQL, which strips out 80 dBASE commands and adds 100 new SQL commands. Either way, execution drags because SQL won't manipulate data

until it references special tables that are linked to source .DBF files. Using SQL in a *dBASE* program isn't any easier: You must save the SQL code in a separate file, compile it, and then link the files or call the SQL code from another *dBASE* program.

For Programmers Only?

All told, *dBASE IV* is a muscular upgrade that matches and sometimes bests the competition. But examine your motives before you buy. If SQL is a must-have, turn to true SQL-based programs such as *Oracle* or *XDB*. And novices are better served with friendlier programmable data managers such as *Paradox* and *R:base*.

Experienced users who do casual programming will find the choice more difficult. *dBASE IV* delivers the goods with a nice mix of flexibility and ease of use, but the price is high, performance is mediocre, and other vendors may soon up the ante. If you need a serious data base programming environment, however, the *dBASE* language is still the answer, and *dBASE IV* offers the best way of taming it. Some *dBASE* clones may be faster, but *dBASE IV* offers the best line of professional programming tools on the market. ●

William Urschel is president of Arc Tangent, a data base-oriented software development company in Santa Barbara, California.

WHERE TO BUY

dBASE IV 1.0

Ashtan-Tate
20101 Hamiltan Ave.
Tarrance, CA
90502-1319
213/329-8000

Requirements: 640K,
DOS 2.0 or later version
(3.0 or later for LAN
Pack)

Nat copy protected

List price: \$795; up-
grade from *dBASE III*
Plus \$175, \$30 if pur-
chased after February
17, 1988; LAN Pack (five
users) \$995

Technical support:
free for 90 days, no toll-
free number, M-F
6-4:30

EXECUTIVE SUMMARY

dBASE IV

Data base manager

With its excellent new editor, debugger, compiler, and application generator, *dBASE IV* offers the best data base programming environment on the market. Nonprogrammers will also be pleased with the new report and screen generators, but novices may find the new menu system forbidding. Other debits include fairly slow performance and an awkward implementation of SQL.

	POOR	FAIR	GOOD	EXCELLENT
Data entry and validation			●	
Development tools				●
File handling and searching		●		
Reporting			●	
Capacity			●	
Performance		●		
Overall value			●	

Other support ser-

vices: Extended Sup-
port (15 calls, Campu-
Serve subscription) \$50
per year; Professional
Support (20 calls,
CampuServe subscrip-
tion, technical newsletter,
copy of Close-Up re-
mate communications
software) \$150 per year
(\$35 per hour surcharge
for Close-Up on-line
help); CompuServe user
group and forum

**For more information,
circle 740 on reader
service card.**

NSTL BENCHMARK TESTING

The exclusive test facility for *PC World*, **National Software Testing Laboratories (NSTL)**, is an independent organization that specializes in evaluating personal computer hardware and software. A recognized pioneer in state-of-the-art test design, **NSTL** believes that the most useful benchmark tests measure how well products perform when executing typical business tasks. **NSTL** testers follow detailed test plans that simulate normal operating conditions. A controlled testing methodology ensures objective, accurate, and consistent results and gives consumers a sound basis for making purchase decisions. **NSTL** publishes its test results in *Software Digest Ratings Report*® and *PC Digest*.™ Neither publication accepts advertising. **NSTL** is located in Philadelphia, Pennsylvania.

OS/2 Data Bases: First Steps

OS/2 versions of Paradox, R:base, Dataflex, and Informix-SQL vie for top billing as the new environment's leading data manager.

But where's the audience?

Users seem fed up with promises and predictions, yet OS/2's proponents still confidently project great leaps forward in productivity. They say that multitasking will let you complete several jobs in the time it once took to do one, while the *Windows*-like Presentation Manager will make learning new programs a snap. Everyone agrees, though, that until OS/2 applications arrive offering capabilities not available with DOS programs, you might as well stick with DOS.

Some vendors claim the wait is over. Four powerful DOS-based data management tools now boast OS/2 siblings. The OS/2 versions of *Paradox*, *R:base*, *Dataflex*, and *Informix-SQL* offer the same generous features as their DOS forebears—plus the DOS look and feel, since none of them are written for the newly released Presentation Manager—and each supports multitasking and has access to abundant RAM (see “Getting the Feel of OS/2,” *PCW*, April 1988, for a summary of OS/2 specifications and features).

But don't be deceived by this additional functionality. Most of it comes from the power of OS/2, not from the programs them-

selves. None of these four packages has been rewritten to take advantage of *multithreading*, where multiple lines of code execute concurrently within a single application. In theory, multithreading is one of OS/2's strongest features and enables you to run several data base tasks simultaneously—or to split a big job into several concurrent processes—using one application in a single OS/2 session.

Simply put, the only way to execute simultaneous tasks with any of these four programs is to run multiple OS/2 sessions. The OS/2 versions of *Paradox*, *R:base*, *Dataflex*, and *Informix-SQL* are really ports of their DOS multiuser counterparts; each OS/2 session is roughly equivalent to a separate workstation session running on a LAN. Furthermore, these programs employ more or less the same concurrency controls for multitasking as their multiuser forerunners do in a DOS network.

For Developers Only

Is the arrival of these programs a compelling reason to switch to OS/2? Probably not. Their DOS equivalents provide the same functions, and only a handful of power users will find the ability to run some of those

*Hal
Chapel*

functions concurrently worth the upgrade. Those few who can really benefit from running multiple queries or lengthy reports in the background, for example, might want to convert.

Data base developers, though, are the biggest beneficiaries. Being able to test applications (or compile code) in the background while writing code in the foreground is a productivity boon. And because both data and code are completely portable between the OS/2 and DOS versions of all four programs, developers' hard work can do double duty.

For developers and users alike, lots of memory is part of the price of admission to the brave new world of OS/2. With the ceiling on user RAM suddenly raised from 640K to 16MB, developers have much more room for code; thus all four packages have compiled their various disk-based overlay files into a single RAM-based .EXE file. In addition, the programs load all RAM not occupied by program code with as much oft-used data as possible.

The result is that *Paradox*, the hungriest of the programs, requires at least 3MB of RAM; the rest need a minimum of 2MB. The bright side is that running multiple sessions requires only a little more memory. OS/2 implements *code segment sharing*, never loading more than one segment of the same code into RAM no matter how many sessions are using it. Thus, if you run multiple *Paradox* sessions, only one copy of the program actually resides in memory; each session shares the code.

Still, 2MB to 3MB to get in the door—and an effective minimum of 4MB to 5MB with data—is a high price to pay. Given that these programs are nearly identical to their DOS equivalents, users have a right to expect substantial benefits, such as a big boost in performance. Alas, the benchmarks performed by National Software Testing Laboratories (NSTL) show that speed is another sticking point.

Dragging the Workload

To compare the performance of the OS/2 programs with that of their DOS counterparts, NSTL began with three basic bench-



marks: a group-record search, a subtotal, and a two-file join. The lab ran each test as a single session under DOS and then under OS/2. As it turned out, only *R:base* performed the single-session benchmarks consistently faster under OS/2 than with DOS.

This simple comparison, though, doesn't address the advantage most often cited by OS/2 proponents: work throughput. In other words, multitasking several chores concurrently should be faster than performing them one after another.

The problem is, the most likely foreground task under multitasking is data entry—and accurately benchmarking data entry is impossible. Instead, NSTL set up a straightforward comparison by determining how long it takes sequential DOS sessions and multiple, concurrent OS/2 sessions to do the same amount of work.

The upshot is that only the OS/2 versions of *R:base* and *Dataflex* out-muscled their DOS predecessors, and then only in the group-record-search benchmark. The remaining concurrent OS/2 sessions took longer—often much longer—to do the same work as the single sessions. This sounds like damning evidence, against either these pro-

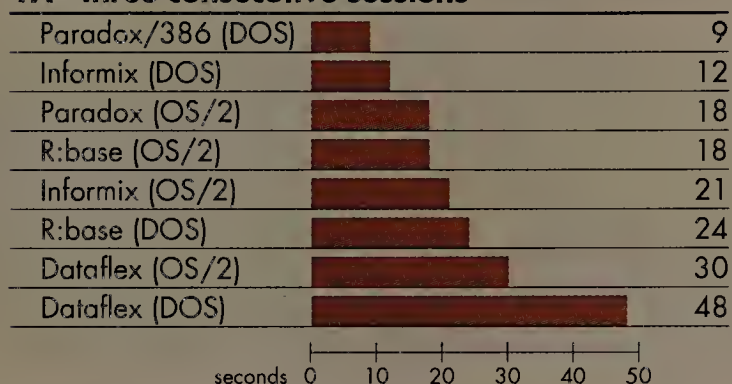
NSTL TEST REPORT

OS/2 Data Managers: Not Built for Speed

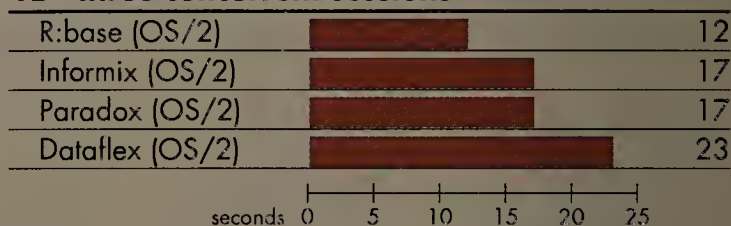
In the data manager melee, R:base for OS/2 comes closest to matching the speed of its DOS version.

Group Record Search on an Index

1A—three consecutive sessions

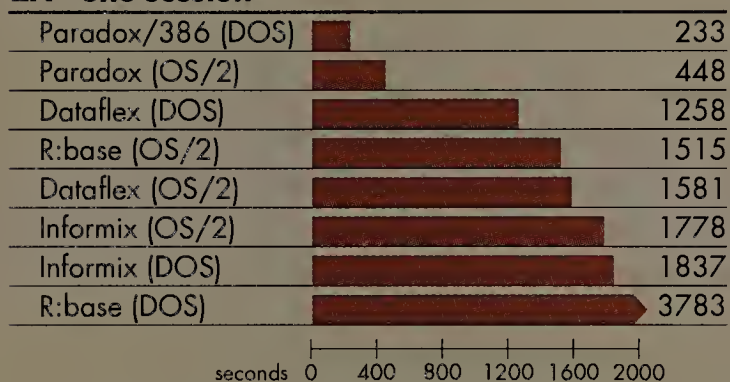


1B—three concurrent sessions

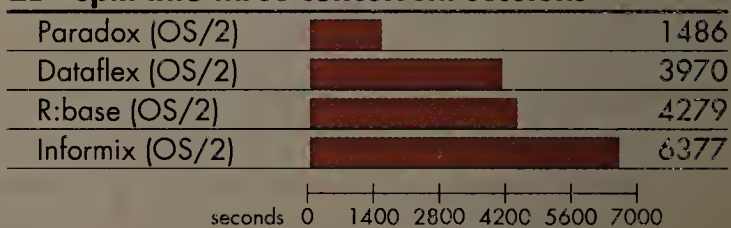


Subtotal of Ten Record Groups

2A—one session

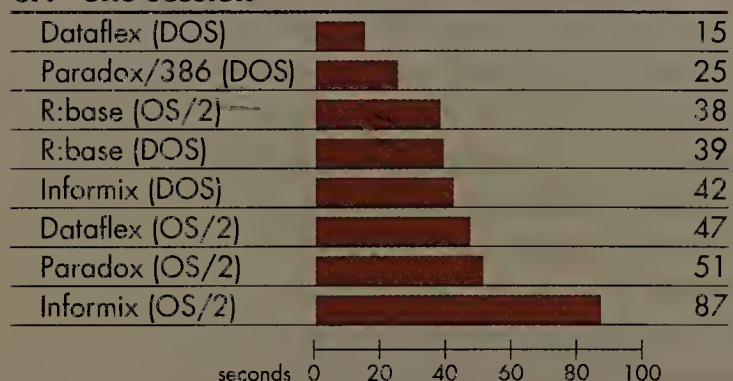


2B—split into three concurrent sessions

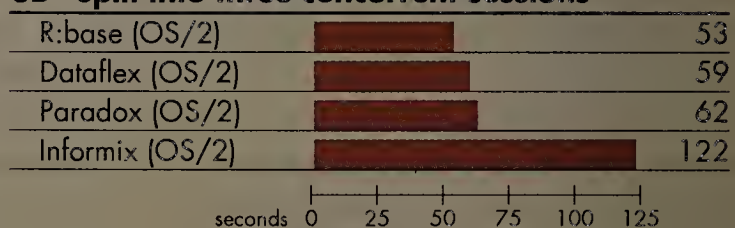


Two-File Join

3A—one session



3B—split into three concurrent sessions



Methodology

The purpose of these tests was twofold: to compare the speed of four OS/2 data managers, and to compare the execution times of the OS/2 programs with those of their DOS versions. First the tests were executed by the programs' DOS versions with caching. The same tests were then executed (using OS/2's disk caching scheme) by the OS/2 versions of these programs in a single OS/2 session.

Next came the multitasking benchmarks. All the multisession OS/2 tests were run in the background using the OS/2 DETACH command to load and start the programs (R:base for OS/2 is incompatible with the DETACH command, so the START command was substituted).

The multisession OS/2 tests were run in the background because OS/2 assigns the foreground task priority. Had one session been in the foreground, the background tasks would have taken much longer, greatly lengthening their overall execution time. In each benchmark recorded here, the tasks had equal priority, and each session ran a task identical to the other sessions' tasks. In all the multitasking tests, each session used a different set of records. Therefore, none of the OS/2 packages' record-locking schemes came into play.

In the first multitasking test (1B), the 1A task was run in three concurrent sessions to see whether performing three times the work simultaneously with the OS/2 versions would take less time than running three consecutive tasks with the DOS versions. To compare how long it takes the DOS and OS/2

versions to search the same number of records, the DOS times listed for 1A represent the result of a single session multiplied by three.

For 2B and 3B, the 2A and 3A tasks were each divided into three parts; each part ran in a separate session, doing a third the work of the single-session benchmark. A comparison of the results indicates how long it took to do the same amount of work in single foreground sessions (2A and 3A) versus three background sessions (2B and 3B).

Each program's native report generator produced the test reports. However, in 1A and 1B, the code produced by Dataflex's report generator was not the optimal code and would have given unrealistically slow results. The report generator produces editable code, so a "jump in" statement was included for a fair comparison with the other programs.

All tests were conducted on a Compaq Deskpro 386/20 with 5MB of RAM and an 80387-20 math coprocessor. Compaq OS/2 1.0 was used for the OS/2 tests; Compaq DOS 3.31 was used for the DOS tests. Each test was performed three times for consistency; the times were then averaged.

The OS/2 tests were performed with a 256K disk cache. The PROTECTONLY tagline in the OS/2 CONFIG.SYS file was set to YES, thereby removing the DOS compatibility box. In the DOS tests, the DOS CONFIG.SYS file included the statements FILES=20 and BUFFERS=25. Compaq's disk caching software was used to create a 256K cache in extended memory for all the DOS tests. All benchmarks were timed from the first keystroke of the command sequence until the last line selected was printed.

Group Record Search on an Index 1A—three consecutive sessions

From the center of a 50,000-record file, 100 records were selected on an indexed field using the relational operators <, >, and = to set selection limits. The selected records were sorted in ascending order and printed to a null printer.

1B—three concurrent sessions

From a 50,000-record file, three sets of 100 records were selected on an indexed field using the relational operators <, >, and = to set selection limits. Each session was assigned a different set of records to retrieve. The selected records were sorted in ascending order and printed to a null printer.

Subtotal of Ten Record Groups 2A—one session

From a 50,000-record account file, ten groups of 5000 records were selected. The records were grouped and sorted on the bank branch ID field in ascending order. The account's balance field was totaled for each branch or group, and the results were printed to a null printer.

2B—split into three concurrent sessions

From a 50,000-record account file, ten groups of 5000 records were selected. Each session used a discrete account table to process the query and processed a third of the records in 2A. The records were sorted on the branch ID field in ascending order. The account's balance field was totaled for each branch or group, and the results were printed to a null printer.

Two-File Join

3A—one session

A 1000-record teller file and a 100-record branch file were joined. The join provided a report of each teller's ID number and name, along with each teller's branch ID number and name. The report was ordered by branch ID number and teller ID number and printed to a null printer.

3B—split into three concurrent sessions

A 1000-record teller file and a 100-record branch file were joined in three sessions. Each session retrieved a third of the records that were selected in 3A. The join provided a report of each teller's ID number and name, along with each teller's branch ID number and name. The report was ordered by branch ID number and teller ID number and printed to a null printer.

Data based on tests designed and conducted by National Software Testing Laboratories (NSTL). All rights reserved.

grams or OS/2 itself, but several important factors deserve consideration.

To begin with, NSTL's benchmarks test just a few of the many functions of a data management system; your own data base operations may yield faster throughput. In addition, because OS/2 gives priority to the foreground task, you wouldn't notice any slowdown if you were entering data in the foreground—and you might not care how long the background task took to finish.

Finally, it's important to note that both the packages and OS/2 are still in their first generation. Future versions will undoubtedly have better-optimized code, and faster throughput will result. This just underscores, however, that it's premature for end users to consider buying the current OS/2 versions of the four programs reviewed.

Old Dogs and New Tricks

The OS/2 versions of *Paradox*, *R:base*, *Dataflex*, and *Informix-SQL* are so similar to their DOS counterparts, it's virtually impossible to tell the difference at the front end. Nonetheless, some internal distinctions bear mentioning. The most significant involve the way multiuser concurrency controls have been adapted to the multitasking environment.

Like their multiuser predecessors, all the programs normally execute the least restrictive lock for the shortest period of time with any given command. Thus, if a command needs to prevent other tasks from updating a record, it shouldn't stop them from reading that record. Unfortunately, these defaults don't always prioritize access in the manner you desire.

If a developer decides to override the defaults and take control of file and record locking, much care and forethought must go into application development. Otherwise, the resulting data contention can yield the same dreaded deadlocks and data spaghetti that haunt multiuser applications. (For more on such problems, see "Share the Wealth!" *PCW*, June 1988.)

Paradox for OS/2

Like the DOS version, *Paradox for OS/2* offers an intuitive query-by-example inter-

EXECUTIVE SUMMARY

Paradox for OS/2

OS/2 data management program

Paradox for OS/2 shares the look and feel of the DOS version, and most concurrency controls ported from the DOS multiuser version shine during multitasking. But it's slower than the DOS version and it lacks a transaction-processing capability

	POOR	FAIR	GOOD	EXCELLENT
Concurrency controls				●
Multisession initiation				●
Development tools				●
Performance			●	
Overall value				●

face, complete with 1-2-3-like menus and tables. And the Personal Programmer, *Paradox's* application generator, remains an excellent tool for both lay users and experienced developers.

The most important change is in the Paradox Application Language (PAL). A single new command, Session, permits PAL developers to write a front end that initiates concurrent processes, each requiring its own *Paradox* session. This demands more memory and processing overhead than true multithreading, and you need to write more code, but the benefit is seamless, menu-driven execution of multiple tasks.

Paradox enjoys the same sophisticated set of data locks offered by the multiuser version, including a "prevent full lock" option that allows maximum concurrent access. If a background task updates a record while you're viewing it, *Paradox* automatically refreshes your screen with the updated information. This auto-refresh exacts a heavy toll on CPU time, but you can enhance performance by setting longer intervals between refreshes.

One of *Paradox's* strengths in a multiuser setting turns out to be a weakness in a multitasking environment. On a LAN, if you request previously locked data, *Paradox* tells

you which user has the lock. Under multitasking, the program identifies which *task* has the lock, giving the requester the option to suspend the task.

This notification scheme works fine if a user running the foreground task has made the request; the user can merely answer yes or no. But if one background task competes with another, the requesting task grinds to a halt—at least until the user cycles the background task around to the foreground and makes a choice. It takes a good developer to avoid this gridlock.

R:base for OS/2

R:base for OS/2 profits from all the improvements in the latest DOS upgrade, *R:base for DOS*. Although not as elegant as *Paradox's* query-by-example approach, *R:base's* new prompt-by-example method still delivers powerful, menu-driven querying. Developers can take advantage of sophisticated debugging tools, while the new Developer's Express module speeds application development.

R:base for OS/2 incorporates the same selection of Structured Query Language (SQL) commands as the DOS version. Unfortunately, *R:base's* partial implementation of SQL is impractical for transaction processing; too much awkward procedural code would be required to supplement the SQL code. Until the program upgrades its SQL capability, *R:base* users are generally better off using the old *R:base* commands, which are still available.

The concurrency control features offered by *R:base* aren't as polished as *Paradox's*, but *R:base* performs better in a multitasking environment. Both programs implement table- and row-level locking in exclusive mode and in shared mode, so other tasks may select data from a table or row but not insert, delete, or update. *R:base* excels, however, by putting requests for locked resources into a queue. After a specified waiting period, *R:base* cancels requests, avoiding the dead stop you risk with *Paradox's* prompt for user response in a background session.

Another *R:base* plus is its ability to let multiple tasks modify the same record concurrently, provided they don't try to update

EXECUTIVE SUMMARY

R:base for OS/2

OS/2 data management program

Offering multiple sessions rather than support for multiple workstations, R:base for OS/2 supplies the same functions as the DOS multiuser version. Its overall performance was the best of the programs reviewed, though the DOS version is still faster. R:base for OS/2 is the best value in the roundup, but it's still only of interest to power users and developers.

	POOR	FAIR	GOOD	EXCELLENT
Concurrency controls			●	
Multisession initiation	●			
Development tools				●
Performance			●	
Overall value			●	

the same fields. R:base mediates simultaneous record updates by prompting the user to accept the change or overwrite the first task's changes. Of course, if the program queries a background task, the requesting task stalls until the request times out. Developers can turn off this automatic control but must replace it with other processes to ensure data integrity.

Of the four programs, R:base is the only one that won't let you run multiple sessions without exiting to the OS/2 prompt. No command equivalent to Paradox's Session is provided. The easiest way to run multiple processes in R:base is to start sessions from OS/2's Program Selector.

Dataflex 2.3b

Dataflex, unlike Paradox or R:base, is an unknown quantity for most PC users. It's basically a data management language that has only recently acquired a front end. Among developers, Dataflex is known to be an excellent package for creating complex multiuser applications, mostly because the program was ahead of its time in supporting concurrency controls. In addition, Dataflex applica-

tions and data are portable not only between the DOS and OS/2 versions, but also among CP/M, UNIX, and VAX/VMS versions.

Slick data entry forms are easy to generate with Dataflex. The program also offers powerful built-in data validation functions that would require programming in the other three packages. And although Dataflex's report generator isn't as fancy as Paradox's query-by-example mode, it's quite extensive. Simply point to the fields you want on a report; enter selection criteria, breakpoints, and headers; and away you go.

Unfortunately, Dataflex has one serious problem with its report generator. Instead of using an index to find the records to print, it goes sequentially through the file—and that means very slow reporting. Fortunately, unlike most report generators, Dataflex's produces code you can edit, enabling you to optimize reporting. (NSTL fixed the code in its tests, or Dataflex's times would have been unrealistically long.) The company claims the report generator will be improved in the next upgrade.

Another drawback is that Dataflex can't perform operations quickly across an entire data file. The other three packages allow you to update all records in a file with just one command; Dataflex, on the other hand, requires that you write a small program that loops through all the file's records. This might not slow performance, but it does increase development time for certain applications.

Like Paradox, Dataflex provides a special command, Runprogram Background, for starting other sessions from within the program or a custom application. Once concurrent sessions are loaded, however, Dataflex provides only crude file locking. No automatic locking scheme prevents different sessions from editing the same record simultaneously; the developer is entirely responsible for maintaining concurrency control. The locks kick in as you attempt to save a record, when a message tells you that data has been changed and asks you to confirm that you really want to write to disk.

Of the four packages in the roundup, only Dataflex and Informix-SQL support background transaction processing. To facilitate a

EXECUTIVE SUMMARY

Dataflex 2.3b

OS/2 data management program

Dataflex is a mainframe-style data manager with a powerful development language. Expensive at \$1650, the program supports transaction processing, though the implementation is crude compared to that of *Informix-SQL*. Unfortunately, the report generator is poorly designed and multitasking performance is mediocre.

	POOR	FAIR	GOOD	EXCELLENT
Concurrency controls			●	
Multisession initiation				●
Development tools				●
Performance			●	
Overall value			●	

background session with *Dataflex*, you use a special Enter macro that automatically locks all files related to a transaction. Although this implementation is primitive compared to *Informix*'s SQL-based solution, it makes *Dataflex* worth considering for batch-processing tasks, such as those demanded by accounting applications.

Informix-SQL 2.10

Like *Dataflex*, *Informix-SQL* comes from a large-system background, sporting both UNIX and VMS versions. Even with the attempt to present 1-2-3-like menus, *Informix-SQL* is hardly an intuitive program. Its main attraction is its bona fide support for SQL, the nonprocedural data management language of the future. (For an overview of SQL and a review of the DOS version of *Informix-SQL*, see "Tomorrow's Data Bases Today," *PCW*, February 1988.)

The promise of SQL lies in its potential for portability. In theory, at least, a single SQL query could retrieve data from PCs, minis, and mainframes linked across a wide area network. Currently, this distributed data base scenario is possible only if the

same package is running on all those systems; a standardized SQL is still some years away.

Fortunately, some of SQL's advantages are available right now. Unlike dBASE, R:base, or PAL, SQL employs a nonprocedural engine that optimizes queries. In other words, a user can write a query without having to specify exactly how the query should be performed, such as which indexes to use or the sequence of the proposed operations. For example, you can update records globally across multiple files, without the tremendous programming effort required by procedural languages.

If you don't want to learn SQL, *Informix-SQL* won't leave you in the lurch. Using menus, you can structure data bases; create data entry, query, and report forms; and even develop menu-driven applications. Translation into the appropriate SQL statements is automatic, though unfortunately, SQL lacks the conditional statements necessary for sophisticated application development. For that you must shell out \$995 for *Informix-4GL*, an add-on package that consists of a full-featured, fourth-generation programming language.

SQL brings unique capabilities to a multitasking setting, especially if you want to run batch data base transactions in the background. It provides such true relational commands as Commit and Rollback, as well as support for audit trails and transaction logs. Thus, a set of record updates is not committed until the entire transaction has completed successfully. If the process fails midway, because of either locked data resources or failed hardware, the entire transaction can be rolled back and the data restored to its original state.

Commit and Rollback capabilities are a must in environments where data integrity is paramount. Unfortunately for *Informix-SQL*, the other three packages are certain to have their own SQL engines in the near term, so the program's lead in mainframelike processing is temporary. In the meantime, without *Informix-4GL*, *Informix-SQL* has the worst development tools and the hardest-to-use interface of the bunch.

The Developer's Edge

Which upgrade a developer selects usually depends on what package his or her company is already using. After all, everyone wants to avoid having to retrain end users.

Soon enough, though, all these packages will be rewritten for the Presentation Manager, and end users will have to accustom themselves to a new user interface anyway. From this perspective, you're left with such criteria as good concurrency controls, support for background batch processing, and superior performance. Overall, *R:base for OS/2* comes out on top. Although its partial SQL implementation can't provide the secure background batch processing of *Informix-SQL*, the program still offers a platform for developers wishing to explore this realm. In addition, *R:base's* fine set of concurrency controls is complemented by the highest performance under OS/2.

Whether many developers will want to write OS/2 applications with any of these packages before the inevitable Presentation Manager versions come out is an open question. Due to file and code portability to DOS, most of the programmers who buy these packages will probably use them for DOS application development. The OS/2 versions of *Paradox*, *R:base*, *Dataflex*, and *Informix-SQL* are complete implementations of their

EXECUTIVE SUMMARY

Informix-SQL 2.10

OS/2 data management program

Informix-SQL's key advantage is a bona fide SQL engine, which simplifies querying and promises future large-system connections. This mainframe-style program also provides full support for transaction processing. Lackluster speed aside, the main drawback is that serious application development requires a separate

\$995 package, *Informix-4GL*.

	POOR	FAIR	GOOD	EXCELLENT
Concurrency controls			●	
Multisession initiation		●		
Development tools		●		
Performance		●		
Overall value		●		

DOS counterparts, but they're really interim products. Not only will future versions run under the Presentation Manager, they'll also undoubtedly use multithreading. And that means multiple data management tasks—without having to explicitly run multiple sessions. ●

Hal Chapel is a Northern California consultant specializing in LAN and OS/2 data base development.

WHERE TO BUY

Dataflex 2.3b

Data Access Corp.
14000 S.W. 119th Ave.
Miami, FL 33186
305/238-0012

List price: \$1650

Requirements:

80286 or 80386 PC,
2MB RAM, hard disk,
OS/2 1.0 or later version
Not copy protected

Technical support:

no toll-free number,
M-F 9-5:30

Other support ser-

vices: \$400 per year
for unlimited toll-free
phone support and up-
grades, \$100 for up-

grades only

For more information,
circle 680 on reader
service card.

Informix-SQL 2.10

Informix Software, Inc.
4100 Bohannon Dr.
Menlo Park, CA 94025
415/322-4100

List price: \$795, *Informix-4GL* \$995

Requirements:

80286 or 80386 PC,
2MB RAM, hard disk,
OS/2 1.0 or later version
Not copy protected

Technical support:

no toll-free number,
M-F 6-5

Other support ser-

vices: \$220 per year
for toll-free phone sup-
port, free updates, and
a quarterly technical
newsletter

For more information,
circle 681 on reader
service card.

Paradox for OS/2

Borland Int'l
P.O. Box 660001
Scotts Valley, CA 95066
408/438-8400

List price: \$725

Requirements:

80286 or 80386 PC,
3MB RAM, hard disk,
IBM OS/2 1.0 or later
version
Not copy protected

Technical support:

no toll-free number,
M-F 8-5

Other support ser-

vices: *Paradox* Devel-
opers Resource Program
(\$295) includes toll-free
number and bundle of
PAL applications, BBS
available through

CompuServe
For more information,
circle 682 on reader
service card.

R:base for OS/2

Microrim
3925 159th Ave.
Redmond, WA 98052
206/885-2000

List price: \$895

Requirements:

80286 or 80386 PC,
2MB RAM, hard disk,
OS/2 1.0 or later version
Not copy protected

Technical support:

30 days free support
from date of first call;
M-Th 7-5, F 8:30-4

Other support ser-

vices: \$175 per year
for unlimited toll-free
phone support, a year's
free updates, a newslet-
ter, and access to Micro-
rim's BBS

For more information,
circle 683 on reader
service card.

Hot Picks in Small Business Accounting

Need a low-cost accounting package but don't know which one's best for your business?

Two CPAs share their insights on eight popular products.

Many people who are shopping for accounting software wonder whether low-cost packages have what it takes to automate their business. As a rule of thumb, low-end software is worth a look if your company does less than about a million dollars in annual sales. Although the best low-cost accounting packages can do a fine job for some larger businesses, at a certain point the extra options and convenience of the high-end systems are well worth the extra cost. Tell-tale signs that your business has outgrown a low-end package include a seven-figure annual gross, more than 200 customer accounts, or more than 300 monthly checks or invoices.

Before you invest in a low-end accounting system, you should be aware of its limitations. As you can see from our Features Evaluation, most low-end general ledgers don't offer power features such as multicompany consolidations; more important, full custom reporting capabilities are rare.

In accounts receivable modules, you're not likely to find great flexibility in billing. Customer-specific billing cycles, trade discounts, and age-dependent dunning notices are usually the province of high-end systems. Accounts payable modules also lack flexibility:

1099 processing and user-specifiable fields for sorting and analysis aren't very common.

Despite these limitations, the best low-end packages can satisfy many businesses' needs at a reasonable price.

How We Evaluated the Software

In searching for the best of the low-priced accounting packages, we looked for products whose quality has been recognized in independent evaluations. We settled on the following eight: *4-in-1 Basic Accounting*, *The Accounting Partner 3*, *Accpac Easy Accounting Series*, *Bedford Integrated Accounting*, *BusinessWorks PC*, *DacEasy Accounting*, *One-Write Plus*, and *Peachtree Complete II*. Although some of these products offer many modules for one base price, this review focuses on the three staples of accounting: general ledger, accounts receivable, and accounts payable.

In judging the packages, we looked especially hard at ease of use. A package's menu system should use plain-English terms, and documentation should be helpful to novices. The data entry process should be intuitive and helped along with useful prompts.

**Ralph
Soucie
and
William
Flora**

12 ISSUES FOR \$23.95!



YES! Please send my FREE copy of 101 Best Desktop Publishing Tips and begin a one-year subscription (12 issues) to Publish! at the low introductory rate of just \$23.95 (that's 40% off the regular subscription rate).

Send no money now. We'll bill you later.

Publish! Publish! Publish!

FREE BOOK

- How to set text diagonally
- Making the most of your font choices
- Secrets of special typographical effects
- Time-saving tricks for using clip-art
- Tips on retrieving lost images

And over 95 other valuable tips from the best desktop publishers in the business!

Name _____

5CND6

Company _____

Address _____

City/State/Zip _____

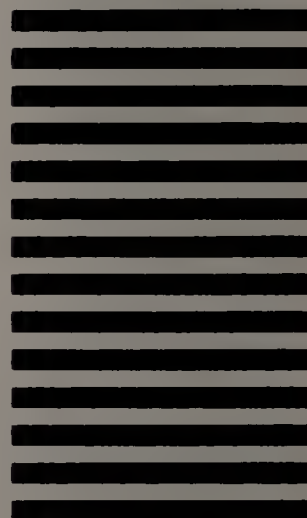
Please allow 6-8 weeks for delivery of your first issue. By regular subscription, Publish! is \$39.90 for 12 issues.

SAVE 40%

**SHIPPING DEPT.
SEND FREE BOOK
IMMEDIATELY!**



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

Publish!

Subscription Department

P.O. Box 55415

Boulder, Colorado 80321-5415



Error-trapping devices are very important, particularly for inexperienced users; the best programs display account descriptions during transaction entry and prevent the posting of unbalanced entries.

We prefer batch to real-time processing (in which entries are posted immediately to the general ledger), since it makes it easier to correct erroneous entries before they are posted. However, very small businesses may actually prefer real-time systems because they expedite entry.

Even low-cost packages should provide a good audit trail—a system for referencing transactions from the general ledger report to the individual journals. All the packages tested meet this minimum standard, but some use system-generated transaction numbers, which make tracing through the documents less of a chore.

Accounting software should also provide automated year-end closing and preferably maintain full transaction detail for the entire year until you decide to clear out prior detail. This system is more forgiving of ordinary slipups, because it allows you to enter ad-

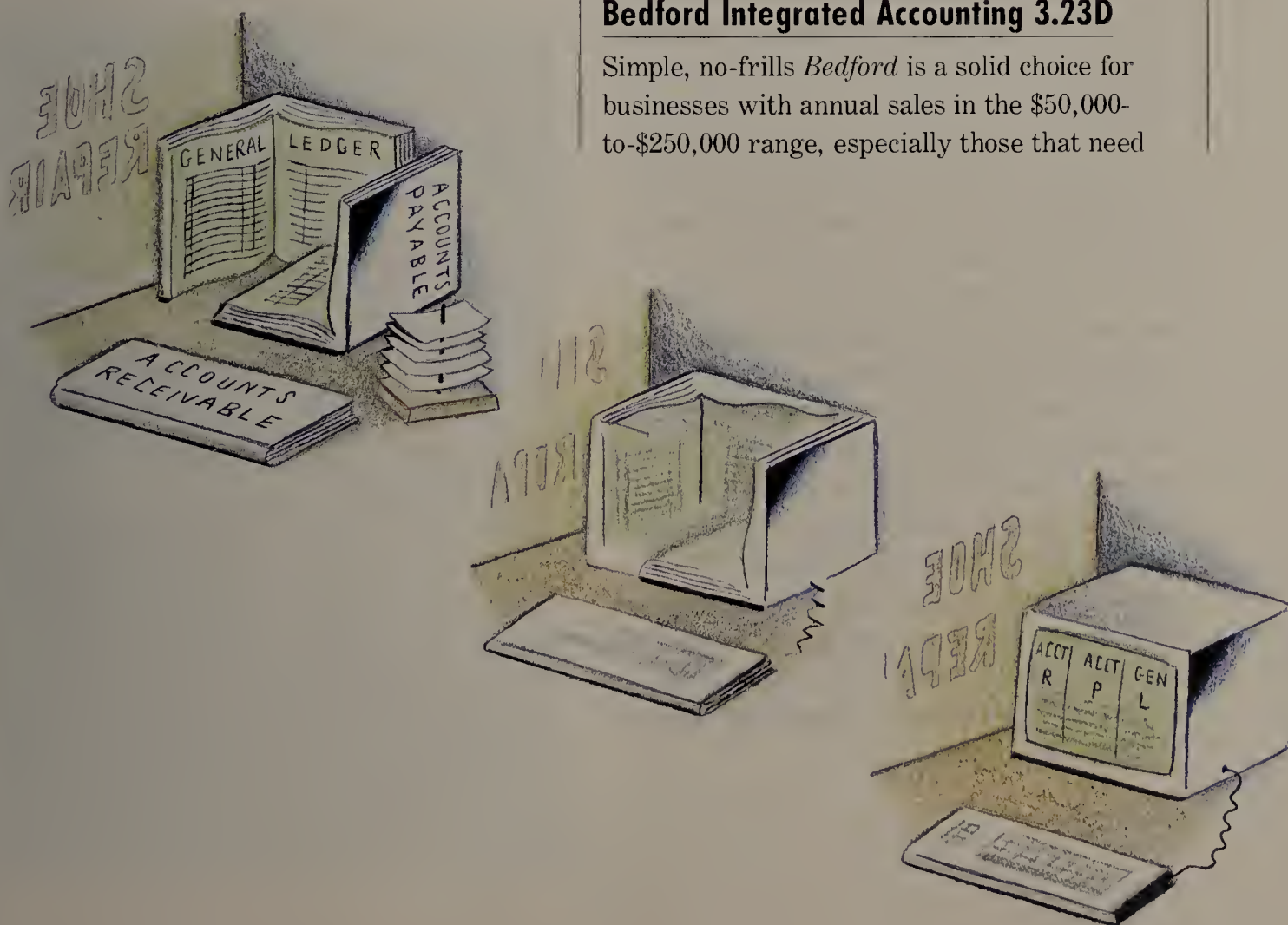
justments into the periods containing the original erroneous transaction.

An important related feature is the ability to maintain several open periods at one time. You'll usually need to begin entering a new month's activity before you have all the information needed to close the prior month. Four open periods is a good minimum because it gets you through the IRS filing deadline without having to close out the prior year.

In our opinion, here's how the products reviewed in this article stack up. *BusinessWorks* and *One-Write Plus* top the list both in power and ease of use and are the most expensive of the group. In the second tier are *Peachtree* and *4-in-1*, both very good values although less capable than the leaders. *Bedford* and *DacEasy* both include six or more modules in the base product yet are priced below \$250. *Bedford* is easy to use but doesn't offer many powerful features. *DacEasy* provides depth as well as breadth, but it still presents challenges to the new user. *Accpac Easy* has the least breadth and depth; it is also inexpensive and quite easy to use. *The Accounting Partner 3* offers power but is difficult to learn.

Bedford Integrated Accounting 3.23D

Simple, no-frills *Bedford* is a solid choice for businesses with annual sales in the \$50,000-to-\$250,000 range, especially those that need



EXECUTIVE SUMMARY

Bedford Integrated Accounting 3.23D

Integrated accounting software

With six easy-to-use modules, including payroll, inventory, and job cost, *Bedford* is a good choice for contractors or retailers who don't need a lot of powerful features.

	POOR	FAIR	GOOD	EXCELLENT
General ledger				●
Accounts receivable			●	
Accounts payable			●	
Audit trail and security				●
Reporting			●	
Overall value			●	

a job-cost module. It's not as powerful as *Peachtree* or *DacEasy*, but it's also less intimidating.

Bedford offers six modules—the standard trio plus payroll, inventory, and job cost—for a reasonable \$249. Installation and setup are generally easy, though creating the chart of accounts can be tedious. All account numbers in the program are limited to three digits, which could pose a problem for larger businesses.

Bedford is a real-time system; conveniently, you can make entries to any period of the year. However, you can't keep the prior year open while starting a new year—a serious deficiency, since most users have to wait at least two months to receive year-end adjustments from their accountants.

Although you can print financial statements for any period while the year is open, *Bedford's* reporting is otherwise limited. Budget and prior-year comparison options are lacking, and financial statements have an ungainly side-by-side design. Bedford Software reports that a new \$99 reporting module scheduled for release in the first quarter of 1989 will add comparison capabilities and graphs.

Despite its lack of on-line help, *Bedford's* logical menu structure and top-notch documentation should get novices off to a flying start. Overall, *Bedford* is good choice for businesses that require inventory, payroll, or job costing but whose accounting needs are otherwise basic.

One-Write Plus 2

One-Write Plus aims to closely approximate manual bookkeeping on a pegboard, or write-it-once, system. Though this concept may strike some as overly cute, it is so elegantly implemented that *One-Write Plus* is the easiest program to use in its class. Add a hefty list of features, and you have a top-notch accounting package for \$250—and *PC World's* Best Buy award. Excellent accounts receivable and accounts payable modules are also available for \$250 each.

The pegboard metaphor pervades the entire system, providing the same backdrop for all types of transactions. The cash disbursements entry screen looks like a check sitting on a sheet of paper. By scrolling the screen, you can reach as many as 50 expense columns.

EXECUTIVE SUMMARY

One-Write Plus 2

Integrated accounting software



One-Write Plus's master module, with its cash receipts and disbursements entry screens, provides all the accounting many small businesses will need. A top-notch accounts receivable module includes professional services billing; the accounts payable module is also very good.

	POOR	FAIR	GOOD	EXCELLENT
General ledger				●
Accounts receivable				●
Accounts payable			●	
Audit trail and security			●	
Reporting			●	
Overall value				●

One-Write's master module combines a general ledger with receipts and disbursements entry screens to provide true cash-basis accounting. Data entry is extremely efficient, and function keys are put to maximum advantage. You can enter transactions in any period in the current year and purge transaction detail as needed.

The master module prints checks singly or in batches and maintains addresses and other data for more than 100 customers or vendors. The separately priced accounts receivable and accounts payable modules expand those limits to 2000 entries and provide a fully functional accrual system. (Cash-basis accounting is not supported in these modules.) Customer and vendor master files are nicely detailed, and you can add new accounts while recording transactions. You can choose invoice formats for goods or services; billing for professional services is particularly well implemented.

Though you can't design your own financial statements in *One-Write Plus*, the standard statements should be more than acceptable for most users. A \$15 utility called Financial Statement Editor permits editing of the reports. For more powerful data query

One-Write Plus V2				SOLARIUM SPECIALTIES, INC.		ACCT #1		\$8,327.75	
RECORD CASH DISBURSEMENTS									
DATE LINE #		PAID TO EXPLANATION		CHECK NUMBER	CHECK AMOUNT	UTILITIES 8810	MISC COLUMN #2		
03/31/89		METALBENDERS, INC.		0	P	4,568.00	4,568.00		
1		PO 8834546							
03/31/89		SMITH & JONES TILE		0	P	8,657.25	8,657.25		
2		PO 8834572							
FOR:MARCH ELECTRIC BILL									
DATE		PAY TO THE ORDER OF		CHECK NO		AMOUNT			
03/31/89		MIDWEST ELECTRIC		3534 M		581.38		581.38	
		1011 SHADY LANE							
		CENTERVILLE, MI 48888							
Enter the distribution amount.									
F1 Help F2 Edit F3 Del F4 F5 Acct F6 Vend F7 F8 F9 Date F10 Save									

and reporting capabilities, Great American Software offers a \$79 product called *Datalink*.

One-Write Plus's engaging interface and cash-basis capability add up to top value for small businesses. Well-designed accounts payable and accounts receivable modules provide expandability, though *One-Write* yields some ground to *BusinessWorks* in overall power.

The Accounting Partner 3 3.0P

The \$349 *Accounting Partner* is one of the more powerful low-cost packages, but it has a quirky interface. Its market is users who aren't intimidated by computerized accounting and who need strong inventory, purchase-order, and payroll functions in addition to basic accounting. All others should steer clear.

Star Software deserves credit for providing conveniences like multiple pricing codes, a pop-up calculator, and a spreadsheet module. You can also run *The Accounting Partner* on a network, although it's not designed as a multiuser product.

But idiosyncrasies keep cropping up. Entering transactions is problematic, moving within and between input screens is awkward, and if you blunder past a warning message, you can force the system to accept unbalanced general journal entries. End-of-

The well-designed transaction entry screen for *One-Write Plus* resembles a peg-board system. Fifty columns are available for disbursements.

EXECUTIVE SUMMARY

The Accounting Partner 3 3.0P

Integrated accounting software

The *Accounting Partner*'s five-module system has strong reporting and other advanced features. We rated the program Fair in general ledger, accounts receivable, and accounts payable because of its awkward interface.

	POOR	FAIR	GOOD	EXCELLENT
General ledger			●	
Accounts receivable			●	
Accounts payable			●	
Audit trail and security			●	
Reporting				●
Overall value			●	

period processing is particularly arcane and frustrating.

The Accounting Partner's reporting set-up is unusually flexible for a product in this price range. *DB Partner*, a separate module available for \$195, adds extra query and reporting capabilities. Journal listings and analyses of purchase and sales activity are also very detailed. On-line help is adequate, but the manual is perfunctory.

The Accounting Partner's ability to do cash-basis accounting is a significant bonus. But overall, the learning effort this package requires makes it unsuitable for the average user.

DacEasy Accounting 3.0

DacEasy Accounting offers a broad range of modules and some powerful features for only \$99.95, but it's hobbled by an inflexible data base and unorthodox reporting. Although the interface has improved over the years, *DacEasy* is still not ideal for beginners. On the other hand, *DacEasy* is one of the few programs reviewed that comes with inventory and purchase-order modules. But if you don't need these functions, you're better off

spending the extra money on *BusinessWorks* or *One-Write Plus*.

To its credit, *DacEasy* offers an impressive array of power features. These include support for an unlimited number of accounts, customers, and vendors; quick maintenance of customer and vendor files during transaction entry; ratio analysis reports; and extremely sophisticated password protection.

But *DacEasy* may throw the unseasoned user off stride. Closing a period automatically deletes all transaction detail for that period, and for practical purposes (such as printing monthly financial statements) you can have only two open periods. We would also like to see better safeguards in the audit trail; novices can all too easily forget to print journal listings at crucial points.

DacEasy's departmental accounting is inflexible, and its reporting is a mixed bag. Budget and historical comparison capabilities are strong, and the program's multilevel account structure gives you considerable flexibility in grouping account balances. Yet the financial statements' overall format remains primitive. Many *DacEasy* users will have to resort to the optional \$99.95 *Graph+Mate* program to produce acceptable reports.

Although *DacEasy* offers impressive power for the money, it remains an uneven and eccentric product that requires more patience than the unsophisticated user should be expected to muster.

EXECUTIVE SUMMARY

DacEasy Accounting 3.0

Integrated accounting software

In terms of modules and features, *DacEasy* offers a lot for only \$99.95, but learning to use it requires discipline and patience—perhaps too much to ask of unsophisticated users.

	POOR	FAIR	GOOD	EXCELLENT
General ledger				●
Accounts receivable				●
Accounts payable			●	
Audit trail and security			●	
Reporting			●	
Overall value				●

BusinessWorks PC 6.1

BusinessWorks is a slick program that's easy to use but powerful enough to satisfy the needs of many small and medium-size businesses. Its particularly intuitive menu system includes practically every report and feature such businesses will ever need. This combination of powerful features and ease of use merits *PC World's* Best Buy award.

Installation is smooth, and the system contains plenty of menu choices to get you started in setting up your company's books. You can use your own chart of accounts or one provided by the program. The documenta-

tion contains a useful tutorial based on accompanying sample data.

BusinessWorks is a real-time system—transactions are posted as they are entered. The program holds up to 25 periods of data, which makes for good comparative reporting. Budgets can be done by department and then consolidated into the company total—a nice implementation. Another feature lists which reports have been printed, so that journals and supporting data are not inadvertently lost prior to closing the period and clearing out the detail.

The accounts receivable module features a full range of reports and options, including invoice printing and finance-charge calculations. Both accounts receivable and accounts payable offer a Flash report, which contains critical customer data in summary form.

BusinessWorks is one of the more expensive packages in this roundup—for \$695, you get general ledger, accounts receivable, and accounts payable modules; or you can purchase the modules separately for \$295, plus \$95 for a mandatory system manager. If you're looking for an intuitive, medium-priced accounting package that can do just about everything, *BusinessWorks* should be on your short list.

EXECUTIVE SUMMARY

BusinessWorks PC 6.1

Integrated accounting software



BusinessWorks' numerous power features are elegantly implemented, making it easy for new users to master the procedures. Although more expensive than most of the

other products, it's the most powerful.

	POOR	FAIR	GOOD	EXCELLENT
General ledger				●
Accounts receivable				●
Accounts payable				●
Audit trail and security			●	
Reporting				●
Overall value				●

The Accounting Partner 3 - Accounts Receivable
Copyright (C) 1988 by Star Software Systems
Individual Invoice Entry

Ver 3.00P

LINE ITEM # 1

1) Item Number :
2) Description : Special shipment of Model 36Z
3) Description :
4) Description :
5) Price per unit : \$6,875.0000
6) GL Debit Account : 121.00
7) GL Credit Account : 401.00
8) Quantity : 2.00
9) Percent Discount : 0.000%
10) Percent Sales Tax : 0.000%

Enter number of item to change (or 0 to end) : _

TOTALS: Sales \$13,750.00 Disc. \$0.00 Tax \$0.00

4-in-1 Basic Accounting 1.0

4-in-1 is a solid choice for small businesses with annual sales in the range of \$200,000 to \$1,000,000. It should appeal in particular to businesses that need its cash-basis posting option and require an impeccable audit trail.

4-in-1 bundles general ledger, accounts receivable, accounts payable, and payroll modules for \$249.95. Its automated installation offers a choice of three master charts of accounts or lets you create your own. Pre-designed financial statement formats accompany the master charts.

Transaction entry screens aren't quite as helpful as they might be—only one line of a transaction is visible at a time. But full transaction detail is maintained for the current year—a very desirable feature. If you run short of disk space, detail can be summarized and purged on a date you specify.

The accounts receivable and payable modules have sufficient features and flexibility to satisfy the requirements of most small businesses, though they inconveniently omit look-up capability for account distributions. *4-in-1* is one of two packages tested that allow the user to post subledgers to the general ledger on either a cash or an accrual basis.

4-in-1's financial reporting capabilities, although not extensive, are adequate for small businesses. Documentation is satisfactory

The Accounting Partner 3's invoice entry screen is not particularly easy to follow. Note that the program doesn't supply account descriptions (items 6 and 7).

FEATURES EVALUATION

Low-Cost Accounting Feature by Feature

One-Write Plus and BusinessWorks PC lead the pack in useful features, but other packages bundle more modules at lower prices.

	Bedford Integrated	One-Write Plus	The Accounting Partner 3	DataEasy Accounting	BusinessWorks PC	4-in-1 Basic	Accpac Easy	Peachtree Complete II
General ledger								
Maximum number of accounts	500	500	9999	△	9998	9999	2000	26,000
Highest account balance	\$20 million	\$1 billion	\$1 billion	\$100 million	\$1 billion	\$10 million	\$1 billion	\$1 billion
Maximum digits per account number	3	6	6	6	6	7	4	6
Maximum number of departments	999	99	99	9999	100	999	10	99
Multiple companies	●	●	○	●	●	○	●	●
Multicompany consolidations	○	○	○	○	○	○	○	●
Maintains budget and prior year's data	○	○	●	●	●	○	● ¹	●
Automatic recurring entries	○	●	○	○	●	●	●	●
Displays entire transaction during data entry	●	●	●	●	●	○	●	●
On-screen general ledger account inquiry	●	●	○	○	●	●	○	●
Accepts entries outside current period	●	●	○	● ²	●	●	●	○
Prints reports to screen	● ³	●	○	● ⁴	●	●	●	● ⁵
Lookup windows	●	●	●	● ⁴	●	● ⁶	○	●
On-line help	○	●	●	●	●	●	○	●
Exports 1-2-3 files	●	● ⁴	● ⁷	○	●	○	●	● ⁴
Includes sample data	●	○	○	○	●	○	●	●
Other modules included in base price								
Payroll	●	○	●	○	○	●	○	●
Inventory	●	○	●	●	○	○	○	●
Purchase order	○	○	● ⁸	●	○	○	○	○
Job cost	●	○	○	○	○	○	○	●
Fixed assets	○	○	○	○	○	○	○	●
Batch processing	○	●	●	●	○	●	●	○
Prevents unbalanced entries	●	● ⁹	○	●	●	●	●	● ¹⁰
Accounts receivable								
Maximum number of customers	999	2000	16,000	△	△	△	2000	14,400
Handles balance-forward and open-item billing	○	●	○	●	●	●	○	●
Prints invoices	●	●	●	●	●	●	○	●
Customer-specific billing cycles	○	○	○	○	○	●	○	●
Customer-specific payment terms	○	●	●	●	●	●	○	●
Automatically computes discounts for early payment	○	●	○	○	●	○	○	●
Automatically computes trade discount	○	○	○	○	●	○	○	●
Automatic recurring invoices	○	●	● ¹¹	○	●	●	○	● ¹²
Automatically computes finance charges	○	●	●	●	●	○	○	●
Cash-basis capability	○	○	●	○	○	●	○	○
Optional compounding of finance charges	n/a	●	○	○	○	n/a	n/a	●
Modifiable intervals for aging	●	●	○	●	○	○	○	●
Number of past-due intervals for aging	3	3	3	6	4	3	1	3
Automatically computes sales tax	●	●	●	●	●	○	○	●
Age-dependent dunning notices	○	○	○	●	●	○	○	○

	Bedford Integrated	One-Write Plus	The Accounting Partner 3	DataEasy Accounting	BusinessWorks PC	4-in-1 Basic	Accpac Easy	Peachtree Complete II
Accounts payable								
Maximum number of vendors	999	2000	16,000	△	△	△	2000	14,400
1099 processing and reporting	○	● ⁴	○	●	● ¹³	○	○	○
Vendor-specific payment terms	○	●	●	●	●	○	○	○
Automatic recurring vouchers	○	●	●	○	●	●	○	●
Automatically computes discounts for early payment	○	●	○	○	●	○	○	●
Automatically computes trade discount	○	○	●	○	○	○	○	●
Cash-basis capability	○	○	●	○	○	●	○	○
Check reconciliation	○	○	○	○	●	●	○	○
Holds payments to specified vendors	○	●	○	○	●	○	○	○
Prevents payments in excess of charges	●	●	○	○	●	○	○	○
Dual-month capability	●	●	●	●	●	●	●	○
Audit trail and security								
General journal transactions have a unique reference (such as a number) other than date ¹⁴	●	●	●	●	●	●	●	●
Transactions in other journals have a unique reference other than date ¹⁴	●	●	●	○	●	●	●	○
General ledger transactions have references corresponding directly with unique journal references ¹⁴	●	●	● ¹⁵	● ¹⁵	●	●	●	○ ¹⁶
System-level password protection	●	●	○	●	●	●	●	●
Command-level password protection	● ¹⁷	● ¹⁷	○	●	●	○	○	● ¹⁸
Reporting								
Provides financial statement templates	●	●	●	●	●	●	●	●
User can customize templates	○	○	○	● ¹⁹	● ²⁰	●	○	●
User can specify column contents for comparisons	○	○	●	○	●	○	●	●
Statement of changes in financial position	○	○	○	●	●	○	○	○
Reports at any time for any period	●	●	○	○	●	●	○	●
Percentage variances	○	○	●	●	●	○	○	○
Aged receivables report	●	●	●	●	●	●	● ²¹	●
Check register	○	●	●	○	●	●	○	●
Cash requirements report	●	○	○	●	●	●	○	●
Sales analysis by customer	●	●	●	●	●	○	○	● ⁴
Mailing labels	●	●	●	●	●	○	○	● ⁴
Optional data base reporter module	●	●	●	●	○	●	○	●

¹ Budget information only.

² Usefulness of this feature is limited because closing a period deletes transaction detail.

³ Screen versions of reports are abbreviated.

⁴ Available through extra-cost module.

⁵ Selected reports only.

⁶ Scrollable lookup windows are provided, but only one line item is displayed at a time.

⁷ Requires use of built-in spreadsheet module as an intermediary.

⁸ Purchase-order functions are included in accounts payable and inventory modules.

⁹ In rare circumstances, system can be forced to accept unbalanced entries.

¹⁰ User can set up system to accept unbalanced entries.

¹¹ Automatic monthly charge capability only.

¹² System can generate monthly statements—but not invoices—containing fixed charges.

¹³ Stores 1099 data, but reporting is cumbersome.

¹⁴ Audit trail data provided by National Software Testing Laboratories.

¹⁵ Transaction references in general ledger correspond with a journal but not with a unique journal reference.

¹⁶ Transaction references in general ledger show individual postings but do not identify journal.

¹⁷ Module-level protection but not command-level protection.

¹⁸ System offers command-specific password protection but cannot limit access to certain important operations.

¹⁹ Financial statement design capability limited to selecting accounts to be included.

²⁰ Account selection is not flexible.

²¹ Report includes columns for current and past-due amounts only.

EXECUTIVE SUMMARY

4-in-1 Basic Accounting 1.0

Integrated accounting software

Though a couple of notches below the most powerful packages in this group, 4-in-1 Basic Accounting is quite capable, offering cash-basis accounting and the strongest audit trail.

	POOR	FAIR	GOOD	EXCELLENT
General ledger			●	
Accounts receivable			●	
Accounts payable			●	
Audit trail and security				●
Reporting			●	
Overall value				●

and well organized, though the package includes neither sample data nor a disk-based tutorial.

Although a good all-around package, 4-in-1 falls somewhat short of *BusinessWorks* and *One-Write Plus* in overall power and ease of use. Still, it merits serious consideration because of its useful features and competitive price.

Accpac Easy Accounting Series 1.0A

At \$89, *Accpac Easy* is the least expensive and least powerful program in this group. Unlike the others, it doesn't provide niceties such as lookup windows or invoice printing. Reporting is less powerful, too—*Accpac Easy* won't do mailing labels or permit customized financial statements.

That said, *Accpac Easy*'s main advantage is that it's truly easy to get going. Electronic worksheets assist in the orderly collection of data. The menu system is based on the functional areas of a small business—an approach that simplifies the learning process.

Accpac Easy handles up to four open periods at a time. A command queue that batches multiple menu items can be used for such conveniences as printing multiple reports. Another desirable feature allows the user to set up journals with prompts for the

most frequently used accounts, simplifying data entry and improving reliability.

A payroll module is available for \$89. Users receive a \$50 credit per module when they upgrade to *Accpac BPI* or \$75 per module for upgrading to *Accpac Plus*, the vendor's more comprehensive accounting packages. In the interim, the inexpensive, straightforward *Accpac Easy* may be shy on power but is still a good option for small home-based businesses grossing less than six figures.

EXECUTIVE SUMMARY

Accpac Easy Accounting Series 1.0A

Integrated accounting software

The price leader of the group, *Accpac Easy* features a kindly interface but limited accounts payable, accounts receivable, and reporting capabilities.

	POOR	FAIR	GOOD	EXCELLENT
General ledger			●	
Accounts receivable	●			
Accounts payable	●			
Audit trail and security			●	
Reporting			●	
Overall value			●	

Peachtree Complete II 4.21

Peachtree will appeal to companies that need a comprehensive accounting system at a modest price. For \$199, it provides general ledger, accounts receivable invoicing, accounts payable, inventory, fixed assets, job cost, and payroll—more modules than even *DacEasy*.

Peachtree is generally easy to set up and use. You can assign up to nine source codes to different types of journal entries. But all journals require you to make an offsetting entry, instead of providing it automatically.

The accounts receivable module is full featured and well implemented, including such options as modifiable aging intervals. Pop-up prompt windows for account and customer entries prove very helpful.

Both accounts receivable and accounts payable modules can be run independently or integrated with the general ledger. One note of caution: *Peachtree* allows users to specify whether the program should accept unbalanced transactions or require printing of audit trail reports. If users forget to check these items, they may overlook errors.

The package supports multiple companies and consolidations. Reports are adequate though not extensive. For businesses that require more reporting capabilities, a data query module is available for an additional \$99 (if purchased in bundled form).

Peachtree is marred by two flaws. Its audit trail meets the minimum standards, but because it uses only dates for cross-referencing transactions, you may have to flip through a lot of paper to track down a given transaction if you post from a journal several times in one day. The program also suffers from an annoying inability to have more than one period open at one time.

But if you can live with these shortcomings, *Peachtree* is an excellent deal, offering more modules and features per dollar than any package we know of. It provides a better interface and more modules than many programs at a very low cost.

EXECUTIVE SUMMARY

Peachtree Complete II 4.21

Integrated accounting software

Peachtree offers just about everything *DacEasy* does but adds payroll, job-cost, and fixed-assets modules. It's a very good value despite its inability to handle more than one open period at a time.

	POOR	FAIR	GOOD	EXCELLENT
General ledger			●	
Accounts receivable				●
Accounts payable			●	
Audit trail and security		●		
Reporting			●	
Overall value				●

BikeWorks International

Posting Date: Jun 30, 1987

Post to General Journal

Header Information

Type of entry: **Standard** Current month:

Voucher Ref #:

Transaction date:

Description:

Posting to:

Acct #	Description	Debit	Credit

Unposted Balance

Select entry type: Done **Standard** Recurring Correcting Reversing

[Esc: Main Menu] [F1: Help]

The Bottom Line

BusinessWorks and *One-Write Plus* are the best of the bunch. If you need all three *BusinessWorks* modules, you can't do better for \$695. But if all you want is general accounting, *One-Write Plus*'s master module is an outstanding deal. At \$250, it boasts the best interface and documentation in the group. *One-Write*'s other modules aren't bad, either.

Aggressively priced *Peachtree* is an easily justifiable choice, especially if you need job-cost or fixed-assets modules. *4-in-1* is a good all-around package, especially if you want cash-basis accounting, and at \$249.95, the price is right. However, both lag behind the leaders in features and flexibility.

DacEasy offers many modules and features, but it's slightly quirky. *Bedford*'s six modules are easier to use than *DacEasy*'s but lighter on power. Although *Accpac Easy* is extremely limited, in terms of price and features it's fine for the fledgling home business. Finally, *The Accounting Partner 3*, while powerful, is not intuitive enough to be recommended for a general audience.

But what if, among all these low-cost contenders, you can't find a system that is strong in all the right areas? One solution is to go high end. If you want to save money, another alternative is to shore up the weak spots with a spreadsheet or a data base application. If a low-cost system doesn't offer a job-cost module, for example, you can track job costs on a spreadsheet, provided your

At appropriate times, *BusinessWorks* automatically supplies convenient field-specific prompts (shown at the bottom of the screen). The information can be selected directly from the menu.

needs are relatively modest. Or you can use a graphing package to produce better-looking management reports. As long as the solution isn't a kludge, the money you save could be substantial. ●

Ralph Soucie is a CPA and consultant with Brian Murphy & Associates in Lake Oswego, Oregon. William Flora is a practicing CPA and president of Oregon Tax & Accounting Software, Inc., in Portland.

WHERE TO BUY

4-in-1 Basic Accounting 1.0

RealWorld Corp.
282 Loudon Rd.
P.O. Box 2051
Concord, NH
03302-2051
800/255-1115

List price: \$249.95 includes general ledger, accounts receivable, accounts payable, and payroll

Requirements: 256K, DOS 2.1 or later version
Not copy protected

Technical support: first 15 minutes \$30, \$2 per minute thereafter or \$175 for six months' unlimited calls and automatic product updates; no toll-free number, M-F 9-8

Other support services: none
For more information, circle 750 on reader service card.

The Accounting Partner 3 3.0P

Stor Software Systems
363 Von Ness Way
Torrance, CA
90501-1494
800/242-7827

List price: \$349 includes general ledger, accounts receivable, accounts payable, payroll, inventory, and spreadsheet; Invoice Partner \$195, DB Partner \$195

Requirements: 384K (512K recommended), DOS 2.1 or later version
Not copy protected

Technical support: \$100 quarterly (maximum 3 hours); \$250 annually (maximum 12 hours, includes free up-

dates); toll-free number, M-F 7-5

Other support services: newsletter; training available
For more information, circle 751 on reader service card.

Accpac Easy Accounting Series 1.0A

Computer Associates
1240 McKay Dr.
San Jose, CA 95131
408/432-1727

List price: \$89, Payroll 1.0 \$89

Requirements: 320K, DOS 2.0 or later version
Not copy protected

Technical support: free for first 30 days after registration (but limited to two calls per module of up to 10 minutes each), no toll-free number; extended support \$50 if enrolled within 30 days, \$75 if after 30 days, limited to four calls per year, toll-free number, M-F 7-5

Other support services: newsletter, 30-day money-back guarantee, user BBS on The Source

For more information, circle 752 on reader service card.

Bedford Integrated Accounting 3.23D

Bedford Software Corp.
15311 N.E. 90th St.
Redmond, WA 98052
206/883-0074

List price: \$249 includes general ledger, accounts receivable, accounts payable, payroll, inventory, and job cost; Integrated Toolbox re-

porting module \$99 (release date is first quarter 1989)

Not copy protected
Requirements: 384K, DOS 2.0 or later version

Technical support: free for 30 days, then \$89 per year including updates; no toll-free number, M-F 8-5

Other support services: newsletter in Canada only
For more information, circle 753 on reader service card.

BusinessWorks PC 6.1

Manzanito Software Systems
One Sierrita Gate Plaza
#200A
Roseville, CA 95678
800/531-3552,
800/447-5700 California

List price: \$695 includes system manager, general ledger, accounts receivable, and accounts payable modules; mandatory system manager \$95, general ledger \$295, accounts receivable \$295, accounts payable \$295, payroll \$295

Requirements: 256K, DOS 2.1 or later version, 10MB hard disk
Copy protected

Technical support: free for 90 days, then \$150 per year (including minor updates); toll-free number, M-F 8-4

Other support services: none
For more information, circle 754 on reader service card.

DacEasy Accounting 3.0

Dac Software, Inc.
17950 Preston Rd. #800
Dallas, TX 75252
800/877-8088

List price: \$99.95 includes general ledger, accounts receivable, billing, accounts payable, inventory, and purchase order; Payroll \$99.95, Graph + Merge \$99.95, Accounting Tutor \$29.95, Payroll Tutor \$29.95, Video Tutor \$49.95

Requirements: 256K, DOS 2.0 or later version
Not copy protected

Technical support: 10 minutes free within 60 days of purchase, no toll-free number; one year of support for all Doc products (limited to 60 minutes) \$75, one year of support for one Doc product (limited to 30 minutes) \$45, toll-free number, M-Th 8-5, F 9-5

Other support services: newsletter; training available

For more information, circle 755 on reader service card.

One-Write Plus 2

Great American Software
9 Columbia Dr.
Amherst, NH 03031
800/528-5015

List price: master module \$250, accounts receivable \$250, accounts payable \$250, payroll \$250, Dotolink \$79

Requirements: 384K, DOS 2.1 or later version
Not copy protected

Technical support: 30 days free with purchase of first module, 15

days more with purchase of each additional module, no toll-free number; toll-free continuing support \$125 per year, covering all purchased modules, includes discounted upgrades and access to BBS; "on the spot" support \$1.50 per minute, 10-minute minimum; M-F 9-7

Other support services: none
For more information, circle 756 on reader service card.

Peachtree Complete II 4.21

Peachtree Software, Inc.
4335 Shackleford Rd.
Narcross, GA 30093
800/247-3224

List price: \$199 includes general ledger, accounts receivable invoicing, accounts payable, payroll, inventory, job cost, and fixed assets; with Peachtree Data Query II \$298

Requirements: 384K, DOS 2.0 or later version, 10MB hard disk
Not copy protected

Technical support: \$1 per minute with \$20 minimum per call, toll-free number, M-F 8:30-5:30

Other support services: 30-day money-back guarantee if product is purchased directly from Peachtree; newsletter; training available from 60 support centers nationwide

For more information, circle 757 on reader service card.



Don't drag your PC along! Take the shortcut between programs and files with Software Carousel.[®]

Why get dragged down by that old PC technology?

Despite the sophistication of today's PCs, there's one thing they still don't do. And that's work the way people work. Jumping from one task to another—from budgets to memos to phone calls and back.

So every time you need to change programs—or just look at another file—it's the same old, tiresome routine—saving, exiting, loading, retrieving. Not very convenient. Not very human. Now you could wait for the “next generation” of computers. Or use Software Carousel, and get the speed and convenience you need today, with the software, and computer, you already own. **Here's how to make Software Carousel work for you.**

Software Carousel is the amazingly easy way to switch almost instantly from Word-Perfect to 1-2-3 to dBASE to DOS to whatever else you want. Or go from one file to another in the same program. All without saving or retrieving—or wasting a precious moment of your time. Or your computer's memory.

It works by creating a number of independent software slots to load your programs into. You get up to ten of these software slots, so you can load up to ten programs.

Need to crunch numbers? Hit a key and there's your spreadsheet. Need your word processor? Don't bother saving your spreadsheet file. Just whip over to your document and do your work. Snap back to your spreadsheet and it's just like you left it. It's like all your programs are “pop-ups,” just a hotkey away.

Or load the same program into a few different slots, each with a different file. Now go from one to another in an instant.

Here's the best part of all.

You may have heard about some other “environment” programs that claim to do something similar to Software Carousel. But there are several important differences.

First, they make you split your memory up among the programs you want to use. Software Carousel lets you use all available memory in each and every program. It even supports expanded and extended memory.

Other environment programs work with only some software. Software Carousel

works with everything. Period. It even resolves conflicts among memory resident programs.

Other software creates a working environment that's complex, unfamiliar, with cramped little windows and strange commands. Software Carousel takes minutes to set-up just the way you want it. All your software looks and acts exactly as it always did. **It's so downright useful, even IBM[®] recommends it.**

Even as you read this page, there are tens of thousands of Software Carousel users zipping through their work without laborious and repetitive commands. And without the usual 640K limit imposed by DOS. In fact, even IBM recommends Software Carousel for use with their most popular mainframe-to-PC communications package.

We think you'll agree, that with this kind of speed, convenience, and next-generation performance, \$79.95 is a small price to pay.

Look for Software Carousel at software dealers everywhere. Or order direct from SoftLogic Solutions by calling us toll-free. If, after thirty days, you're not satisfied that Software Carousel is the right way to get that old PC technology off your back, we'll gladly arrange for a refund of your purchase price.

Here's what people are saying about Software Carousel:

“Can't believe how well it works. Who needs 80386?”
—Ralph Evans, Attorney, Fullerton, CA

“Unlike other attempts (e.g. MS Windows, DesqView) yours works, is not fragile and does not intrude its ‘personality’ on everything that we do.”
—Colin Ralph, Ralph & Panzer, Inc., Seattle, WA

“Fantastic program. Great book. Saves me an hour a day! Thanks.”
—Larry Pearsal, Rolling Hills Covenant Church, Rolling Hills Estates, CA

“Solved all my problems with resident software.”
—Walter Affouritt, West Islip, NY

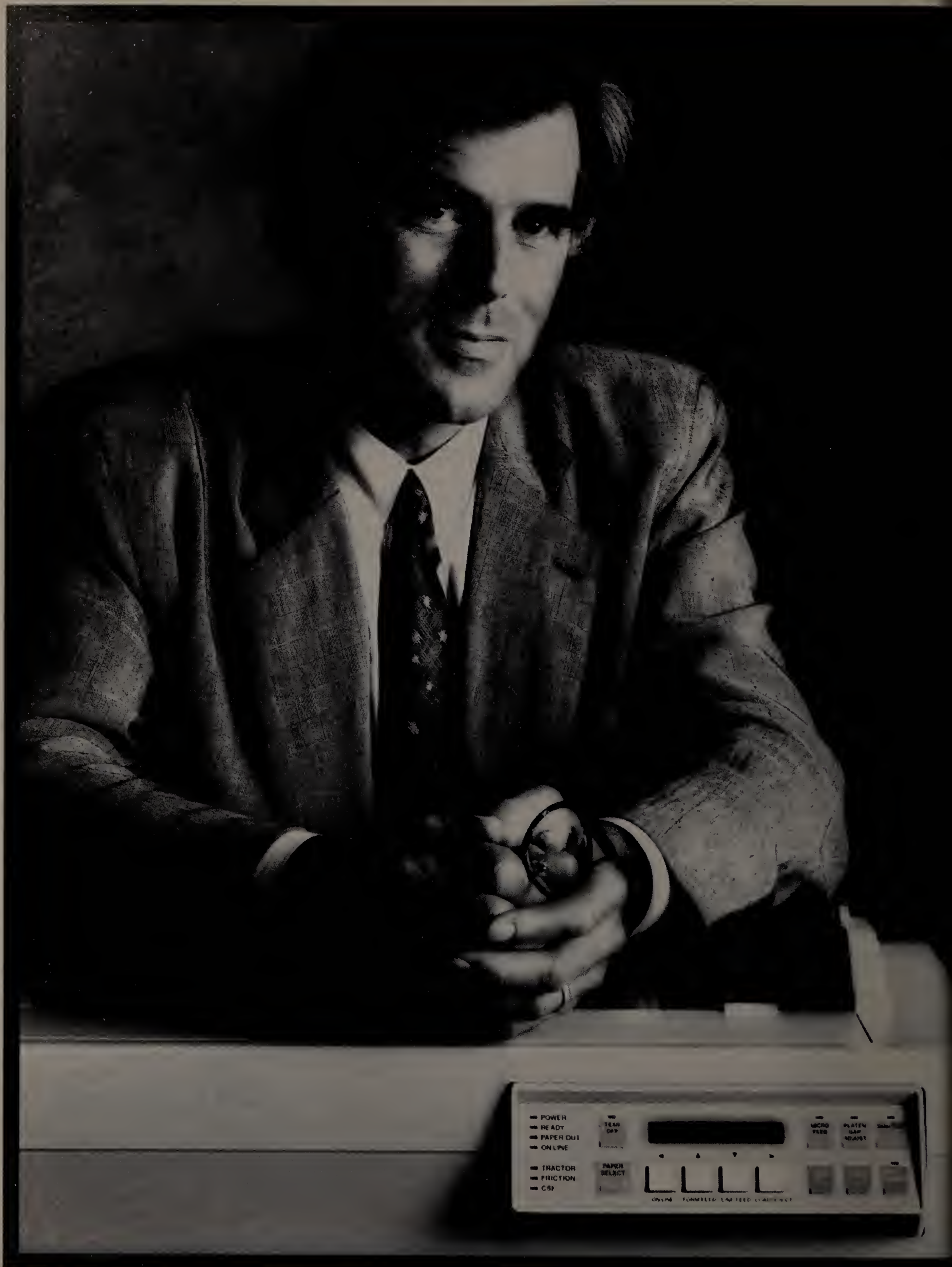
Software Carousel \$79⁹⁵

**SOFTLOGIC
SOLUTIONS**

One Perimeter Road
Manchester, NH 03103
(603)-627-9900 in NH

Call 800-272-9900

IBM is a registered trademark of International Business Machines Corporation. 8



Epson LQ-2550. 24-pin; 400 CPS/draft; 133 CPS/letter quality; 360 x 360 bit image graphics; 136 column carriage; short form tear-off; automatic paper thickness and top of form adjust; optional dual-bin cut sheet feeder; one year limited warranty. Epson is a registered trademark of Seiko Epson Corporation. SmartPark is a trademark of Epson America, Inc., 2780 Lomita Blvd., Torrance, CA 90505. **(800) 922-8911.**

"There's no question I wanted a letter quality printer. One with lots of typestyles. Color, if I could get it. Wide carriage. Paper handling. And controls that make it very easy to use. This new Epson I bought has it all. In fact,

if this printer can't do it, you probably don't need it done."

From the leader in dot matrix printing comes the ultimate letter quality printer. The new Epson® LQ-2550. Among its many features you'll find seven perfect typestyles, high-quality graphics, built-in color and Epson's advanced SmartPark™ paper handling.

SmartPark is the easiest way ever to alternate between fanfold and single sheet paper. Or envelopes. Or even forms. And you can control just about everything with one touch of our SelecType panel.

To keep your work flowing, the LQ-2550 includes time-saving macros. Use them to pre-set your printer for the formats you use most often. Memos, spreadsheets, graphs, business letters. After that, one button is all it takes.

The **LQ-2550** remembers the settings for you.

In addition, the LQ-2550 comes with something nobody else's letter quality printer will ever have. Epson's undeniable reputation for reliability, performance and value. Anything less just won't do.



**WHEN YOU'VE GOT AN EPSON,
YOU'VE GOT A LOT OF COMPANY.™**

TOPS—The Low-End Link to Macs

Looking for a friendly PC LAN that lets you connect PCs, Macs, and LaserWriters without spending a bundle?

TOPS may be the answer.

When businesspeople think about LANs, they generally think of two kinds: high-end, full-featured work-group products, like *NetWare* and *3 + Share*; and low-end serial LANs that offer little more than file transfer and printer sharing. TOPS (Transcendental OPERating System), a low-cost, twisted-pair LAN from Sun Microsystems, falls somewhere in between.

TOPS 2.0 provides many features of the high-end LANs at a fraction of the cost—and requires neither a costly, dedicated server nor a costly, dedicated network administrator. Its biggest plus is that it lets you connect PCs with Macs and LaserWriters. Its biggest minus is that you can't run multiuser network applications like *dBASE*, *Higgins*, or *WordPerfect 5.0*.

TOPS is memory resident but it's well-behaved; it runs alongside *SideKick*, *SuperKey*, and most other popular TSR applications without a hitch. Easy to use and install, its biggest drawbacks (aside from lack of multiuser support) are low speed and an official 32-node ceiling. In fact, if you try to run more than 10 nodes you're asking for trouble.

Within these limits, however, TOPS delivers the goods. Like the big-league LANs, it lets you copy files from one computer to another, access remote data files, run programs that reside on remote computers, share printers, and exchange E-mail. But for most

users, TOPS's main attraction is the way it bridges the chasm between the two leading personal computer platforms by allowing PCs and Macs to exchange files, share printers, and send E-mail. (Unfortunately, neither TOPS nor any other network can enable you to run Mac applications on a PC, or vice versa.)

Up in a Hurry

Setting up TOPS hardware is delightfully simple. Each PC needs a half-length 8-bit network board called a Flashcard, along with a Teleconnector—a small adapter with two standard telephone jacks that attaches to the Flashcard. (If you're looking for a slot-saving alternative, Hercules will sell you a special version of its Graphics Card Plus with a TOPS port added; no additional Flashcard is required.)

Since networking capability is built into every Apple LaserWriter and Macintosh, these components don't need Flashcards; you can attach Teleconnectors to them directly. Then, just link the Teleconnectors with standard twisted-pair telephone cable, and you're networked. (A TOPS network can span 4000 feet—12,000 feet with a \$189 repeater.)

Installing TOPS software is equally painless. On the PC side, you use the menu-

**Robert
Lauriston**

driven installation program to copy the program to your hard disk. You may also need to edit a parameters file with a word processor; this procedure is a bit tricky for first-timers and would be far easier to handle if it were part of the installation program. On the Mac, you run the Installer to copy the software to the Mac's hard disk and then drag the appropriate printer files into your system folder with the mouse.

Working on the Net

Logging on to a TOPS network requires no password; you just run a simple batch file. The familiar DOS prompt appears, and you can go right to work as usual.

Although TOPS runs at only 750 kilobits per second (significantly slower than ethernet's 10 megabits), under normal circumstances network access seems as fast as if you were reading data off a local hard disk. Under heavy usage, however, you'll notice performance degradation as the number of users increases.

Accessing remote data or hardware, or making your own data available to others—a procedure known as *publishing*—is done via the simple TOPS menu. Using the menu, you can assign drive letters to remote directories (whether on a PC or a Mac); you can also identify remote printers as ports (LPT1, COM1, and so on) and then install your applications to use those ports automatically. Once you've acquired access to a useful set of remote directories and printers, you can save those assignments to a batch file and load them automatically each time you start up.

Because a TOPS network has no central server, the notion of a network printer requires some adjustment. TOPS allows you to use any printer connected to any PC, assuming the user of that PC has made it available and you have given it a port assignment, as well as any Apple LaserWriter connected directly to the net. (The \$189 *NetPrint* program is required if you want to print from within DOS applications to an Apple printer.) TOPS provides a print queue that displays a list of jobs waiting to print, client names, and the size of each job.

Some programs available for both the PC and the Mac (such as *PageMaker* and *Micro-*

soft Word) can use TOPS to open compatible data files on any PC or Mac on the network. For other programs, TOPS includes a Mac application that can convert most data files—like those created in *1-2-3*, *WordStar*, and *MultiMate*—to and from foreign formats quickly and effectively.

The Bottom Side of TOPS

Since TOPS does *not* require an administrator, administrative options are minimal. For instance, full network backup is impossible. You can back up your own work, of course, and any published directory can be

TOPS TOPS ITSELF

According to Sun, TOPS 2.1, a major upgrade at no increase in cost, should be shipping by the time you read this. It will offer ethernet and NETBIOS support, full DOS 3.3 file and record locking, *WardPerfect 5.0* compatibility, and an option that allows you to install a stripped-down version of the operating system that uses only 90K of memory. Upgrades to previously installed systems will be available for \$30 to \$45.

—R. L.



FEATURES EVALUATION

Mac-PC Network Challenge: TOPS Versus 3+Share

The TOPS network lacks the administrative features of 3+Share but delivers comparable Mac-PC connectivity—at less than one-third the price.

- Yes
○ No

	TOPS 2.0	3+Share 1.3.1
Price		
4-PC, 1-Mac network exclusive of workstation computers ¹	\$3012	\$9785
Setup and installation		
Dedicated server required	○	●
Menu-driven software installation		
Server	●	● ²
Workstation	●	●
Attaching Mac workstation requires board	○	●
Maximum number of stations per LAN	32	unlimited
Maximum number of remote directories at once	10	26
Printer installation		
Access to LaserWriter	●	●
Access to PC workstation printers	●	○
Printer can be attached directly to net	●	○
RAM required by workstation software	220K	100K
Auto log-on (via batch file, etc.)	●	●
Unloads network software without rebooting	●	○
Changes and saves directories accessed at log-on	●	●
Context-sensitive help	○	○
DOS shell	○	●
File and printer sharing		
Runs remote applications	●	●
Opens remote files	●	●
Mac-PC connectivity		
Mac folders appear as DOS subdirectories on PC	●	●
DOS subdirectories appear as folders on Mac	● ³	●
PC has full access to Mac text/data files	●	●
Mac has full access to PC text/data files	● ³	●
Background translation between Mac and PC files	○	●

	TOPS 2.0	3+Share 1.3.1
File and printer sharing (continued)		
Multuser features		
NETBIOS compatibility	○	●
Multiple users can edit same file at once	○ ⁴	●
Full DOS 3.3 file and record locking	○	●
Printing		
Local printer on any PC can be made available to the network	●	○
Local printer on Mac can be made available to the network	○	○
Print queue	● ⁵	●
Administration		
Security		
Log-on password	○	●
Can restrict file creation and deletion in subdirectory	○	●
Can limit subdirectory access to one user at a time	○	●
Utilities		
Troubleshooting	○	●
Traffic monitor	○	●
Menu-driven backup software	○	●
Backs up entire network	○	●
Training		
Recommended	○	●
Available from company	○	●

¹Price includes network boards and LAN operating system. 3+Share price includes a low-end (\$3000) 80386 server; TOPS price includes NetPrint for all PCs.

²Installation requires 3+ installation and administration course or experience in network installation and is usually done by vendor.

³Requires disk accessory.

⁴Multiple users can use file at the same time if application does not require NETBIOS.

⁵Cancel only, no reordering.

backed up on any other PC. However, if any directories are unpublished, there's no way for a system administrator to back up the whole network. Security is also a weak area.

Another of TOPS's major flaws is its hunger for memory. It eats 220K of RAM; after loading DOS and TOPS on a 640K machine,

you may be left with as little as 350K—not enough to load large spreadsheets or run RAM-intensive applications. As a solution, TOPS suggests RYBS Electronics' Hicard, which includes a memory management program that allows most TSRs, including

TOPS, to run in unused memory between 640K and 1MB. (There's no support for expanded memory.)

Not the Tops, but Good Enough

If Mac connectivity is not a big issue at your office, or multiuser capability is, you may do better with Novell's entry-level *NetWare ELS*, which provides higher performance (via ethernet), multiuser support, better security features, and an upgrade path at about the same price. However, *NetWare ELS* is limited to 5 nodes; theoretically, TOPS can go as high as 32, although 10 or 12 is the practical limit. Moreover, *NetWare* does not yet talk to Macs.

3 + Share does talk to Macs; what's more, it's faster than TOPS and offers full multiuser support. But this power doesn't come cheap. To connect four PCs, one Mac, and a LaserWriter with *3 + Share*, you'll pay about \$10,000 (not including the workstation computers and printer), while a comparable TOPS installation comes in at only \$3000. *3 + Share* may also require costly attention from an installation consultant, as well as a trained administrator.

TOPS is one of those products that trade off a certain amount of power in return for a tempting price and ease of use. If Mac connectivity is a must and you can forgo multi-

EXECUTIVE SUMMARY

TOPS 2.0

LAN operating system

TOPS is a low-cost, easy-to-install, easy-to-use PC network that offers Mac connectivity plus most of the core features of conventional dedicated-server networks—except for multiuser application support. It's a bit slow, can't really handle more than 10 or 12 stations, and comes up short on security and administrative features. But if Mac connectivity is essential and you don't use multiuser applications, it delivers real value at a bargain price.

	POOR	FAIR	GOOD	EXCELLENT
Setup and installation				●
File and printer sharing			●	
Administration			●	
Overall value				●

user applications, TOPS will let your Macs and PCs make beautiful music together—accompanied by the pleasant sound of the cash you saved jingling in your pockets. ●

Robert Lauriston is a San Francisco-based computer consultant specializing in Word-Perfect and LAN installations.

WHERE TO BUY

TOPS

Sun Micrasystems
950 Marina Village
Pkwy.
Alameda, CA 94501
415/769-9669

List price: TOPS-DOS
\$189, TOPS-Mac \$249;
NetPrint \$189; Telecon-
nectar \$59; Flashcard
\$239; repeater \$189

Requirements: DOS
2.1 or later version, 512K
RAM

Warranty: one year
unlimited parts and
labor

**Extended warren-
ty:** none

Technical support:
no toll-free number,
M-F 7-5

Other technical

support: BBS, BIX
**For more informa-
tion, circle 601 on
reader service card.**

RYBS Hicard

RYBS Electronics
2590 Central Ave.
Boulder, CO 80301
303/444-6073

List price: unpopu-
lated \$179, with 512K
RAM \$590; HI386 soft-
ware \$169

Requirements: DOS
2.0 or later version

Warranty: two years
unlimited parts and
labor

**Extended warren-
ty:** none

Technical support:
no toll-free number,
M-F 8-6

**Other technical
support:** BBS
**For more informa-
tion, circle 602 on
reader service card.**

**Hercules Network
Card Plus Total Net-
work Solution**

Hercules Computer
Technology, Inc.
921 Parker St.
Berkeley, CA 94710
415/540-6000

List price: with 512K
Screenfont RAM, Tele-
connector, and TOPS
software \$618

Requirements: none
Warranty: two years
unlimited parts and
labor

**Extended
warranty:**
none

Technical support:
no toll-free number,
M-F 8:30-5

**Other technical
support:** none
**For more information,
circle 603 on reader
service card.**



126 IBM PS/2 Model 30 286

The AT bus rides again, in a sleek new PS/2 system. A highly integrated motherboard and disk caching software may offset hard disk and expansion limitations for IBM 286 regulars.

130 Arche Pro-File 286

A class act in nearly every respect, this hot new AT-compatible tower gives more than one 386 a run for the money.

132 Hewlett-Packard LaserJet IID

HP's industrial-strength version of the LaserJet II adds duplex printing, a wealth of fonts, and a powerhouse print engine for heavy-duty office use.

136 Intel 2400B Modem 2, MultiTech MT224ES

Both of these 2400-bps internal modems equal the Hayes in software compatibility and performance, and both are excellent buys, but one has a definite edge.

146 Plus Passport

Plus Development's breakthrough removable drive combines easy installation with speed that rivals conventional hard disks.



The IBM Model 30 286 is the first PS/2 to revert to the AT bus. VGA is built in, but the only hard disk IBM offers is a low-capacity 20MB unit.

IBM PS/2 Model 30 286

AT-compatible system

PROS: Small footprint, highly integrated motherboard, disk caching software included

CONS: Slow, small hard drive; meager standard memory; limited device-expansion capacity

When IBM first announced its line of PS/2 computers, it claimed the new Micro Channel bus was the architecture of the future. Many users were not convinced. The new PS/2 Model 30 286 suggests that even IBM may be starting to wonder whether the Micro Channel is the *only* road to the future. The first PS/2 that reverts to IBM's original 16-bit AT bus, this sleek new 80286 system combines the familiar features of the good ol' AT with the compact modernism of the PS/2.

The Model 30 286 (\$3405 with 1MB of RAM, a 1.44MB 3½-inch disk drive, a VGA color monitor, and a 20MB hard disk that boasts its own on-board controller) sports a highly integrated motherboard with built-in VGA; floppy controller; parallel, serial, and mouse ports; and a socket for the hard drive—all packed into a slim silhouette. On the downside, its 10-MHz CPU running at one wait state is a bit underwhelming now that 12-MHz systems are more common. But its most serious drawback is a slow (80ms), low-capacity (20MB) hard disk.

Thanks to the disk caching software that IBM bundles with it, the Model 30 286 performed decently on National Software Testing Laboratories (NSTL) benchmarks, despite the slow drive. The system ran neck and neck with the original 10-MHz IBM Model 50 (not shown) and the AST Premium/286 Workstation 243X. As you might imagine, it passed the NSTL Crash Test without a hitch.

The basic system includes a measly 512K of 120ns RAM, a low count considering that many 80286-based machines now come with 1MB of standard RAM. On the other hand,

the well-designed motherboard holds up to 4MB of RAM via two upgrade options—512K (\$215) or 2MB (\$995). There's a socket for an 80287 math coprocessor as well.

The unit's small size necessitates some trade-offs. For instance, there's room for only three 8/16-bit expansion slots; but because IBM has built so much into the system board, the three-slot limit won't be much of a problem for most users.

Other compromises are harder to take. Not only is the Model 30 saddled with a slow, small hard drive, you're stuck with it, and IBM has revealed no plans to offer a faster or larger drive. Furthermore, with hard disk and floppy drives occupying the Model 30's two half-height drive bays, adding a second internal hard disk requires a hard disk on a card, such as Plus Development's Hardcard.

With its thoughtful package of motherboard integration, small footprint, and familiar AT bus, the Model 30 286 could have been a big winner, a kind of latter-day AT. But the old IBM foibles persist. A single hard disk option, and a poor one at that, is unacceptable, and selling an 80286 machine with only 512K is downright silly.

And as usual, the price is wrong; for only \$50 more, you could get the small-footprint AST Premium/286 Workstation with a fast, 40MB hard drive. Still, for many business users, Big Blue's reputation for reliability and service outweighs everything else, and for those poor, benighted souls the Model 30 286 may well be the AT of the nineties.

—Paul Meyers

WHERE TO BUY

IBM PS/2 Model 30 286

IBM

900 King St.

Rye Brook, NY 10573

800/447-4700

List price: with 512K RAM, 1.44MB floppy drive and controller, VGA, parallel port, serial port, mouse port, DOS 4.0 \$1995; with 20MB hard drive \$2595

Accessories: 12-inch VGA Mono-

FEATURES EVALUATION

New 286 Systems: Features Face-Off

IBM's PS/2 Model 30 286 bests AST's Premium/286 Workstation in slot expandability and price. The 16-MHz Arche Pro-File is \$1167 less than the 12-MHz Compaq Deskpro 286 and boasts a smaller footprint.

- Yes
○ No

	IBM PS/2 Model 30 286	AST Premium/286 Workstation 243X	Arche Pro-File 286	Compaq Deskpro 286
Standard features				
Price	\$3405 ¹	\$3805 ²	\$4330 ³	\$5497 ⁴
CPU	80286	80286	80286	80286
CPU speed	10	6/10	8/16	8/12
Built into motherboard				
Parallel ports	1	1	○	○
Serial ports	1	2	○	○
Floppy disk controller	●	●	○	○
Video adapter	●	●	○	○
Mouse port	●	○	○	○
Coprocessor support	10-MHz 80287	10-MHz 80287	10-MHz 80287	8-MHz 80287
Disk caching software included	●	●	○	●
Complete documentation	●	●	●	●

Memory

Basic unit	1MB	1MB	1MB	1MB
Bus capacity	4MB	4MB	8MB	8MB

Expandability

8/16-bit expansion slots/number free	3/3	2/2	6/4	6/4
8-bit expansion slots/number free	0/0	0/0	2/1	2/2
Half/full-height storage device bays	2/0	2/0	2/2	4/2
120MB or larger hard disk available from manufacturer	○	○	●	●

Ergonomic design

Switchless installation	●	○	●	○
Compact footprint	●	●	● ⁵	○
Tilt-and-swivel monitor	●	●	●	●
Front-panel reset button	○	●	●	○
Front-panel on/off switch	●	●	●	○

¹ Price includes 1MB of RAM, 1.44MB floppy drive, 20MB hard disk, parallel port, serial port, VGA, color monitor, 101-key keyboard, DOS 4.0.

² Price includes 1MB of RAM, 1.44MB floppy drive, 40MB hard disk, parallel port, two serial ports, VGA, color monitor, 101-key keyboard, DOS 3.3.

³ Price includes 1MB of RAM, 1.2MB floppy drive, 44MB hard disk, parallel port, two serial ports, EGA board and monitor, 101-key keyboard, DOS 3.3.

⁴ Price includes 1MB of RAM, 1.2MB floppy drive, 44MB hard disk, parallel port, serial port, VGA, color monitor, 101-key keyboard, DOS 3.3.

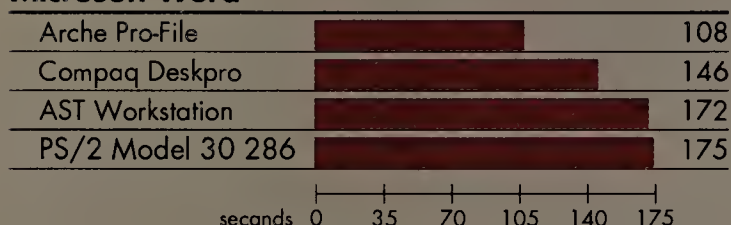
⁵ Floor-standing model.

NSTL TEST REPORT

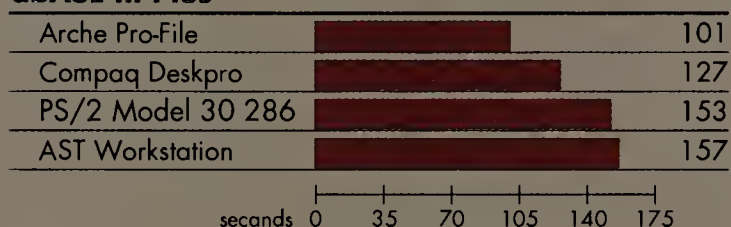
Two New Systems Race the Competition

IBM's PS/2 Model 30 286 runs neck and neck with AST's small-footprint Premium/286 Workstation 243X on 1-2-3, Word, and dBASE but slips a bit behind on C. Predictably, the 16-MHz Arche Pro-File 286 trounces the 12-MHz Compaq Deskpro 286.

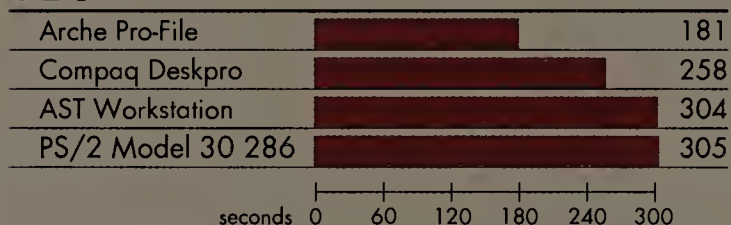
Microsoft Word



dBASE III Plus



1-2-3



All machines were tested with a coprocessor and a disk cache consisting of 256K in extended memory for all tests except the 1-2-3 benchmark. The 12-MHz Compaq Deskpro 286 was configured with a 42MB hard disk and 2.1MB of RAM. The 16-MHz Arche Pro-File 286 was configured with a 40MB hard disk and 3.7MB of RAM. The 10-MHz AST Premium/286 Workstation 243X was tested with a 20MB hard disk and 1MB of RAM. The 10-MHz IBM PS/2 Model 30 286 was tested with a 20MB hard disk and 1MB of RAM.

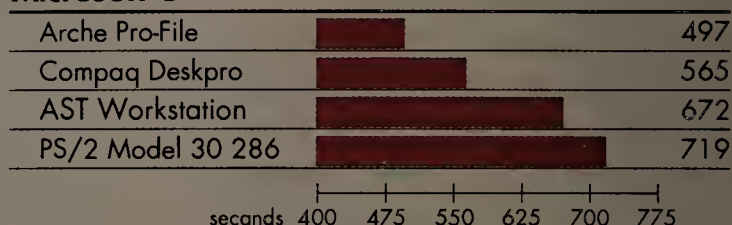
Microsoft Word 4.0

A Microsoft Word macro loads a 35-page, 140-paragraph document and performs search-and-replace and spell-checking operations. The first page of the document is then printed. Although the results of the benchmark depend primarily on processor and memory access speeds, display adapter and hard disk speeds are also contributing factors.

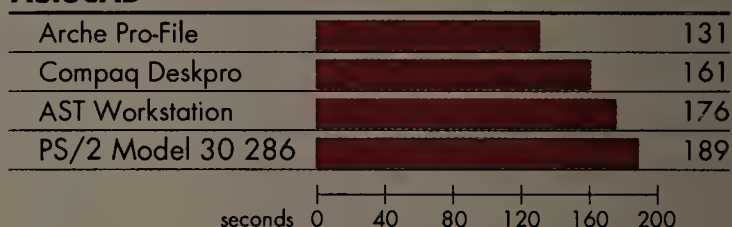
dBASE III Plus 1.1

The dBASE III Plus test measures the time required to prepare and print a report of past-due invoices. The report includes calculated fields and is based on three files: a 500-record customer file, a 1000-record invoice file, and a 2000-record item file. When disk caching is not used, the random access speed of the hard disk is, after processor speed, the most significant factor in this benchmark. With disk caching, sequential read performance becomes more important than random access.

Microsoft C



AutoCAD



1-2-3 2.01

In this benchmark, a 1-2-3 macro executes a series of recalculations using five different formulas within a 75-by-75-cell matrix. Because there are few screen updates and no screen access is required, the results depend almost entirely on processing and memory access speeds.

Microsoft C 5.0

The Microsoft C benchmark measures the time required to compile and link XLISP, a public-domain program composed of 25 C source code files. The most important factors in this benchmark are processor and memory access speeds. The performance of the hard disk is also a factor; generally, disk caching has little effect.

AutoCAD 9

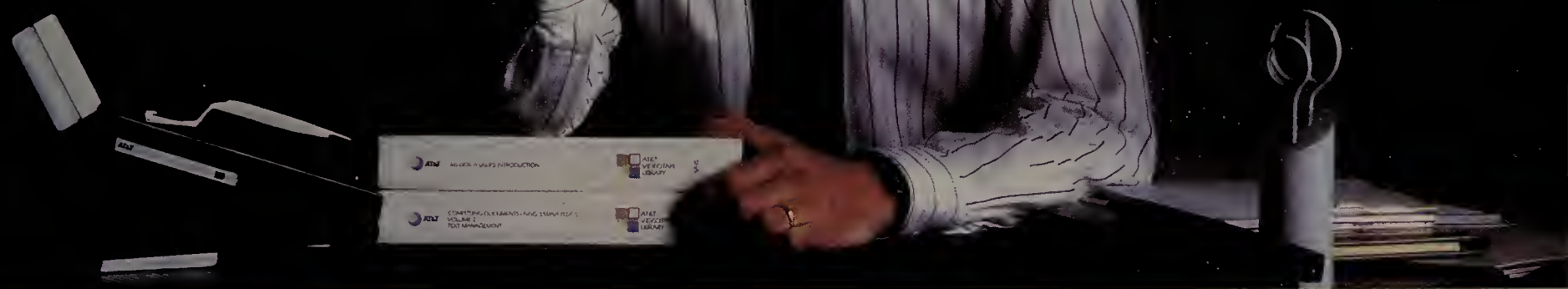
In this benchmark, a three-dimensional sample drawing is retrieved and displayed using AutoCAD's EGA driver. The zoom function is used to display the drawing from various perspectives; then the full drawing is printed. The results of the benchmark depend primarily on the speeds at which the processor and coprocessor operate and at which memory is accessed. The performance of the display adapter and the hard disk also have some effect.

Data based on tests designed and conducted by National Software Testing Laboratories (NSTL). All rights reserved.

chrome Display \$275, 19-inch 8514/A
 Monochrome Display \$865, 12-inch
 VGA Color Display \$750, 16-inch 8514/
 A Color Display \$1550; 512K RAM up-
 grade \$215, 2MB RAM upgrade \$995
Warranty: one year limited parts and
 labor

Extended warranty: annual main-
 tenance contract available
Technical support: through dealers
Other support: none
**For more information, circle 690 on
 reader service card.**

**"My word processing,
database, and MS-DOS
software training is
available any time my
staff needs it. It's top
quality. And I paid much
less than I expected."**



The AT&T Videotape Library. Convenient. Affordable. Unsurpassed quality.

The experts at AT&T bring you definitive software training accessible 24 hours a day. At a surprisingly low price.

It's the AT&T Videotape Library — with five courses sure to meet your training needs:

- Composing Documents Using SAMNA PLUS IV™
- WordPerfect™: An Office Tutorial
- dBASE III PLUS® — First Steps
- Database Management Using INFORMIX-SQL®
- MS-DOS®: A User's Introduction

All with high resolution graphics and video blackboards.
And backed by our exclusive

telephone support line, giving you direct access to expert AT&T instructors.

We offer convenient classroom courses, too.

So get the computer training

you need, any time you need it.
Call the experts at AT&T today.

AT&T COMPUTER TRAINING.

Come right to the source.

1 800 247-1212, ext. 219.

Or send in the coupon below.

Registrar, AT&T Training, P.O. Box 45038, Jacksonville, FL 32232-9974



YES! I want top-quality training. Please send me more information about AT&T Videotape Library courses in:

☐ MS-DOS Software ☐ Word Processing ☐ Database Training

Name (Please print) _____

Title _____ Phone () _____

Company _____

Address _____

City _____ State _____ Zip _____

PCB03019

© 1989 AT&T

MS-DOS is a registered trademark of Microsoft Corporation • SAMNA PLUS IV is a trademark of SAMNA Corporation • WordPerfect is a trademark of WordPerfect Corporation • dBASE III PLUS is a registered trademark of Ashton-Tate • INFORMIX-SQL is a registered trademark of INFORMIX Software, Inc.



AT&T

The right choice.

Arche Pro-File 286

AT-compatible system

PROS: Very fast, outstanding device expandability, supports up to 8MB CPU-speed RAM

CONS: No disk caching software, costly

With more and more 80286 systems running at 16 and even 20 MHz, many business users are finding it harder to justify shelling out the extra bucks for an 80386. The Arche Pro-File 286 tower is a perfect case in point. With its swift 16-MHz CPU and a 28ms hard disk, the Pro-File 286 not only outperforms most 286s, it can give more than one 80386 system a run for the money—especially on CPU-intensive benchmarks like *1-2-3* and *Microsoft Word*.

Configured with 1MB of RAM, a 1.2MB floppy drive, a 44MB Microscience hard disk, and an EGA board and monitor (VGA is not

The Arche Pro-File 286 is a fast, well-designed 16-MHz system whose full-speed memory bus holds a generous 8MB—but it's not cheap.

currently available), the Pro-File 286 lists for \$4330. Standard features include a ROM-based utility that allows you to install peripherals without setting motherboard jumpers, and support for up to 8MB of RAM accessible at full CPU speed.

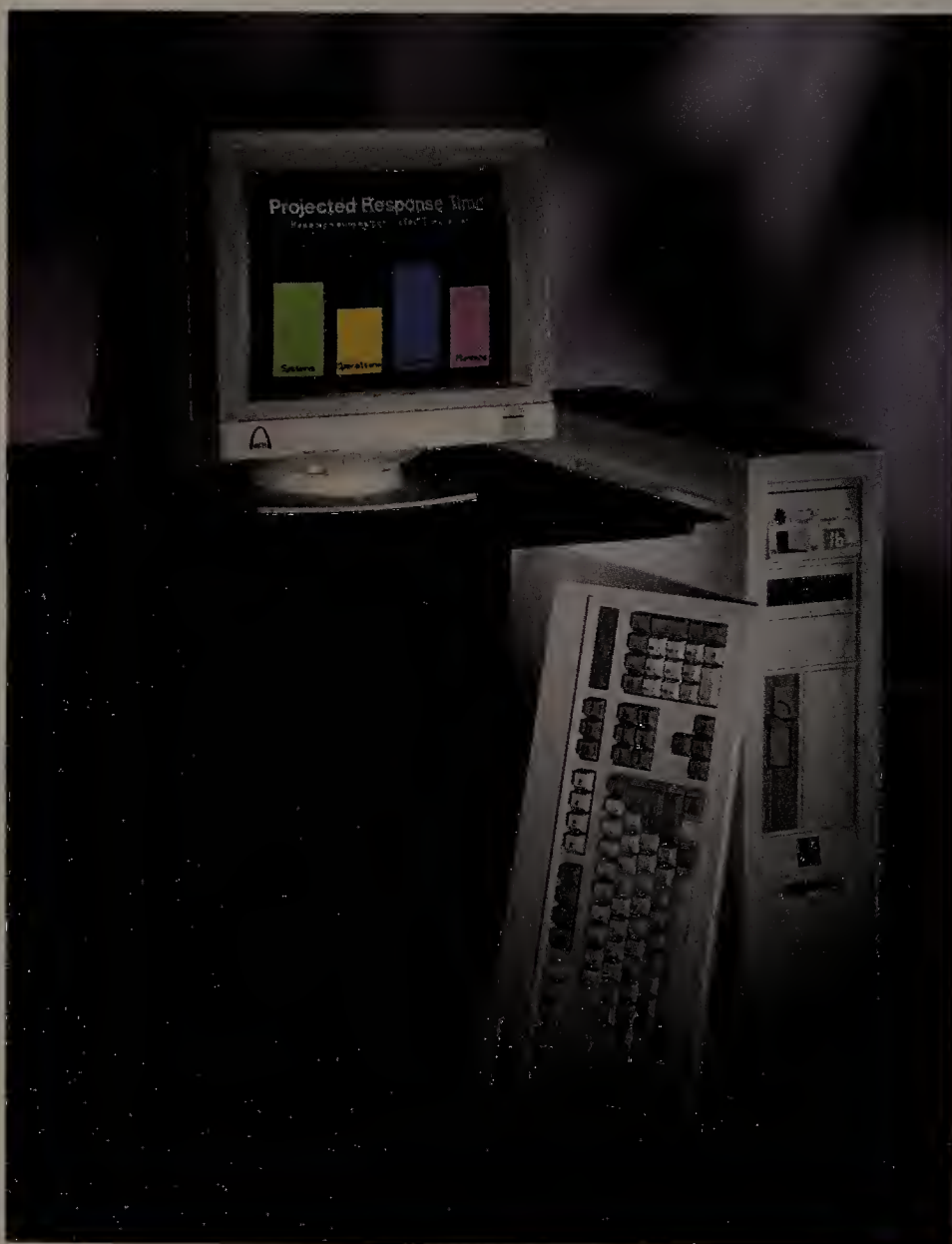
No disk caching software comes with the Pro-File 286, but with the popular *PC-Kwik* disk caching program installed, Arche's machine clobbered the 12-MHz Compaq 286 (which costs \$1167 more) in every test. In fact, the Pro-File stuck impressively close to the 16-MHz Compaq Deskpro/386 (not shown) on *1-2-3*, *Microsoft Word*, and *dBASE III* benchmarks. Furthermore, it boasts impeccable software compatibility; it aced the NSTL Crash Test without a problem.

The Pro-File's motherboard holds up to 4MB of 100-nanosecond, 1-megabit DRAM chips. In addition, Arche provides an 8/16-bit slot with an extra connector that lets you access another 4MB of RAM (on a proprietary \$240 expansion board) at a full 16 MHz. If you prefer to use this slot for a conventional expansion board, the board will run at industry-standard 8 MHz.

The expansion bus also contains two conventional 8-bit and five conventional 8/16-bit slots. However, once you plug an Adaptec disk controller and an I/O board into two of the 8/16-bit slots and a display adapter into an 8-bit slot, you've got just five slots left open; use the special 16-MHz slot for memory expansion, and you're down to four. That's fine for a desktop unit, but only average for a tower.

Device expandability is outstanding, though. There are four externally accessible half-height bays—two for 5¼-inch floppy drives and two for 3½-inch drives—and additional space inside for two full-height 5¼-inch hard drives. There's even room for a third full-height hard drive just below the 275-watt power supply.

The Pro-File's ergonomics are excellent. Indicators and power and reset switches are conveniently located on a front panel near the top of the tower. A large digital readout located next to the on/off switch prominently



1024X768 IBM COMPATIBLE VGA VIDEO CARD

VGAWONDER™

H E S E C O N D W O N D E R

1024X768

Plus: VGA, EGA, CGA, MDA & Hercules on Standard MULTISYNC monitors

Yes! the Phenomenal VGAWONDER does it all at IBM Hardware level compatibility with automatic monitor detect and no dip switches or jumpers to set. A HOT CARD for the 286/386 POWER USER with AUTO BUS DETECT for 8 or 16 bit slots, running with a 16 bit datapath with 1:1 interleave. 100% IBM HARDWARE LEVEL COMPATIBILITY means that ALL software and operating systems designed for IBM systems will run. 1024 WILL BE DISPLAYED IN COLOR ON STANDARD MULTI-FREQUENCY MONITORS. Although these features are expected from ATI they are NOT AVAILABLE from other manufacturers. EGA on all monitors including RGB & TTL means a perfect card for networks. MOUSE ON BOARD! ATI built the mouse right in to this one, why not? No extra charge! VGAWONDER is available in both 512K and 256K Versions. Ask your dealer for more information.



Circle 302 on reader service card

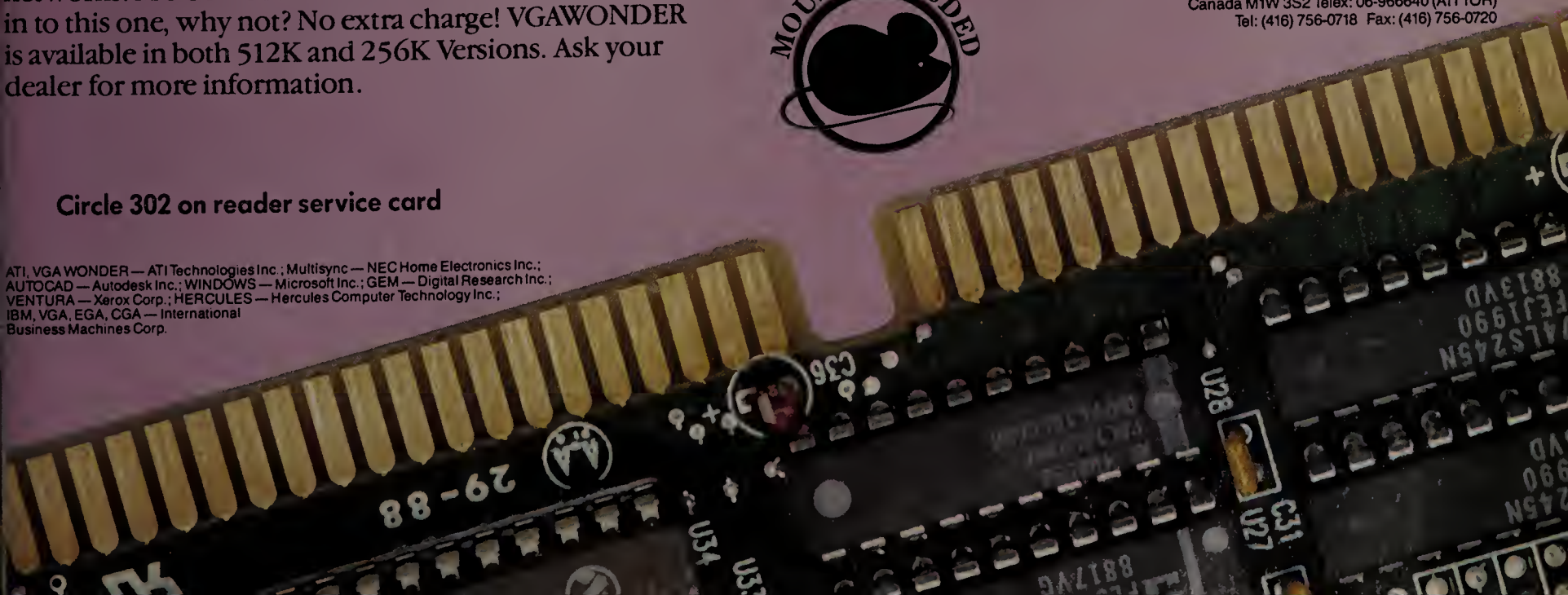
ATI, VGA WONDER — ATI Technologies Inc.; Multisync — NEC Home Electronics Inc.;
AUTOCAD — Autodesk Inc.; WINDOWS — Microsoft Inc.; GEM — Digital Research Inc.;
VENTURA — Xerox Corp.; HERCULES — Hercules Computer Technology Inc.;
IBM, VGA, EGA, CGA — International Business Machines Corp.



TECHNOLOGIES INC.

Technology you can Trust.

ATI Technologies Inc.
3761 Victoria Park Ave., Scarborough, Ontario
Canada M1W 3S2 Telex: 06-966640 (ATI TOR)
Tel: (416) 756-0718 Fax: (416) 756-0720



displays the CPU speed, which is switchable between 16 and 8 MHz.

The little touches are all well done. Setup and configuration are easy thanks to an unusual ROM-based, switchless installation utility. You also get a hardware memory controller that can turn RAM above 1MB into EMS 4.0 memory. DOS 3.3 and GW BASIC come free.

The Pro-File 286 is one of the best 80286 systems we've looked at. Features like switchless setup, built-in EMS 4.0 support, and an 8MB high-speed-memory capacity make it unique—and its 16-MHz CPU makes it one of the hottest AT compatibles we've ever tested. True, it's not cheap. You can buy a lowball 80386 clone, such as the 20-MHz Micro 1 Tower (see *The Hardware Shelf*, PCW, November 1988), for \$600 less—and get the ability to run programs like *Windows/386*. But the Arche is obviously a cut above the usual low-end bargain, and intangibles like reliability and good engineering can be worth more than a few dollars saved.

—TJ Byers

WHERE TO BUY

Arche Pro-File 286

Arche Technologies Inc.
48881 Koto Rd.
Fremont, CA 94539
415/683-6760

List price: with 1MB RAM, 1.2MB 5¼-inch floppy drive, parallel port, two serial ports, 14-inch monochrome monitor and odopter, 101-key keyboard \$2995; with EGA monitor and odopter, 28ms 44MB Microscience hard disk \$4330

Accessories: 28ms 122MB Microscience ESDI hard disk \$1645, 720K floppy drive \$179, 1.44MB floppy drive \$199, 360K floppy drive \$139, 1.2MB floppy drive \$149; unpopulated zero-wait-state memory expansion adapter \$240; EGA and 14-inch color monitor \$600

Warranty: two years parts and labor

Extended warranty: none

Technical support: toll-free number, M-F 7-6

Other support services: none
For more information, circle 691 on reader service card.

Hewlett-Packard LaserJet IID

Laser printer

PROS: Prints on both sides of paper, 400-sheet capacity

CONS: Big, heavy, expensive

For several years, Hewlett-Packard's LaserJet Series II has been the printer of choice in the business market. Now HP has released the LaserJet IID, a powerhouse designed for high-end, heavy-duty office applications. The 8-page-per-minute (ppm) LaserJet IID retains the handiest features of the Series II—the convenient toner cartridge, the easy-to-use front control panel, the painless paper path, the twin font-cartridge slots. The IID adds duplex (two-sided) printing and an optional envelope feeder, doubles the II's 200-sheet paper tray capacity, raises the monthly usage limit from 12,000 to 16,000 pages, and augments the II's six internal fonts with eight additional built-in fonts and ten more included on a Times/Helvetica font cartridge.

The new machine is not cheap; it costs a cool \$4295, compared with \$2695 for the II and \$3799 for Toshiba's 12-ppm PageLaser 12. And its bulk and weight make it hard to move. But the IID's duplex capability and envelope-feeding option will be welcome features at most offices.

The duplex capability lets you print documents using half the number of sheets. The feature works flawlessly, although it slows throughput and causes the printer to emit alarming clanks. However, no current word processors support duplex printing directly; you must turn it on via the front panel or an escape sequence.

Unfortunately, the complicated duplex paper path requires an oversize housing. The IID is about twice as large as the II and, at 74 pounds, weighs nearly twice as much. Moving it to another desk, let alone another office, is a major operation.

The optional envelope feeder (\$350) attaches in about 15 seconds. It works fairly well but, again, cannot be accessed directly

GE RENTS BIG BLUE FOR A LITTLE GREEN.



APPLE® MACINTOSH™ AND COMPAQ, TOO.

Short-term projects can be long on problems if you don't have the computer equipment you need. That's why renting PCs and peripherals from GE for presentations, trade shows, training sessions or seasonal expansion makes so much sense. Our vast inventory of IBM, Compaq, Apple, quality compatibles and related equipment is ready for fast overnight shipment. Plus, we guarantee the equipment you rent works when it arrives. So, from a sea of Blue to a bushel of Apples, one phone call is all it takes. Call 1-800-GE-RENTS, Dept. J.

Get This Special Offer, Too!

Call today and get your FREE catalog of GE Rental/Lease products and services. Ask for your copy when you place your order, or call our special information number—1-800-345-2451.

To Order, Call 1-800-GE-RENTS, Dept. J.
For Information, Call 1-800-345-2451.
Or Mail This Coupon.

- ☐ Yes! I need to rent PCs and peripherals ASAP. Please have a representative call me immediately!
- ☐ Please send me your FREE catalog of GE Rental/Lease products and services.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____ Ext. or Dept. _____



GE Rental/Lease

Send to: GE Rental/Lease, P.O. Box 105625, Atlanta, GA 30348

IBM is a registered trademark of the International Business Machines Corporation. "Macintosh" and "Apple" are registered trademarks of Apple Computer, Inc. Compaq is a registered trademark of Compaq Computer Corp.

NSTL TEST REPORT

HP LaserJet IID Aces Out Toshiba PageLaser 12

Hewlett-Packard's LaserJet IID is rated at only 8 pages per minute, but it whips the 12-ppm PageLaser 12 on graphics printing and on NSTL's combination of text and graphics. It trails the PageLaser on text printing with an HPLaser1 driver, but only by a few seconds.

Plain text, TTY driver

Toshiba PageLaser 12	107
HP LaserJet IID	160

Plain text, HPLaser1 driver

Toshiba PageLaser 12	156
HP LaserJet IID	160

seconds 0 35 70 105 140 175

Graphics

HP LaserJet IID	39
Toshiba PageLaser 12	66

seconds 0 15 30 45 60 75

Text and graphics

HP LaserJet IID	248
Toshiba PageLaser 12	575

seconds 0 120 240 360 480 600

Benchmarks were conducted using a 12-MHz Compaq Deskpro 286 Model 40 equipped with 1.2MB of RAM. Text printing speed was tested using a typical business document created with Microsoft Word 4.0. Graphics printing speed was tested using a 1-2-3 graph. PageMaker version 1.0a was used to test the printers' ability to produce text and graphics on the same page. Timing began when the command to print was issued and ended when the last page came to rest in the output tray.

Plain text, TTY driver

This benchmark timed the printing of 20 pages of plain text without enhancements or formatting using Word's TTY printer driver.

Plain text, HPLaser1 driver

This benchmark timed the printing of the same 20 pages of plain text using Word's HPLaser1 printer driver.

Graphics

This benchmark timed the printing of a 1-2-3 stacked bar chart using the Hewlett-Packard LaserJet Plus driver with the high-density option.

Text and graphics

This benchmark timed the printing of an 8-page newsletter containing text and graphics—various type sizes and fonts, a scanned photo, and a line drawing—using the HP Series II printer driver.

Data based on tests designed and conducted by National Software Testing Laboratories (NSTL). All rights reserved.

by any current word processor; you have to use the control panel or an escape sequence.

NSTL tests prove the 8-ppm-rated IID to be a speed demon. It even beat Toshiba's 12-ppm PageLaser 12 on graphics and text-and-graphics benchmarks and trailed the PageLaser by only a few seconds on plain text printed with an HPLaser1 driver. The tests turned up no software incompatibilities, although it was not possible to use duplex with PageMaker.

The IID comes with 640K of built-in memory—128K more than the II, but still not enough for a full page of bit-mapped graphics. The printer has room for up to 4MB of additional RAM.

Toshiba's PageLaser 12 costs \$500 less and offers an optional envelope feeder. But the IID's extra features outweigh the PageLaser's cost advantages. If you want a heavy-duty print engine, lots of fonts, duplex printing, and LaserJet reliability, there's only one choice: Hewlett-Packard, the winner and still champion. —M. G.

WHERE TO BUY

Hewlett-Packard LaserJet IID

Hewlett-Packard Co.
19310 Pruneridge Ave.
Cupertino, CA 95014
Call HP sales office listed in telephone directory white pages

List price: \$4295

Accessories: envelope feeder \$350; EP toner cartridge \$125; font cartridges \$150–\$330; soft fonts \$200; paper tray \$69; 1MB memory board \$595, 2MB memory board \$1195, 4MB memory board \$2295

Warranty: one year parts and labor

Extended warranty: yes

Technical support: no toll-free number, M–F 7–6

Other support: third-party newsletter

For more information, circle 692 on reader service card.

With CompuServe, you can fax from your computer without a fax board.

Now there's a faster, easier way to send letters, contracts, orders, or any kind of text directly from your computer to any fax machine in the world. Without adding an expensive fax board to your computer and sacrificing an expansion slot.

CompuServe has added the speed and convenience of fax to its long list of business-building services. And the price of faxing on

CompuServe makes good business sense, even before you consider all the other benefits.

For example, when you're away from your office, you can fax from your laptop or another computer. Composing and sending from your keyboard gives your recipient a sharper, cleaner fax. And CompuServe sends you a confirmation of every fax you send.

Circle 40 on reader service card

To fax from your computer, all you need is a personal computer with a modem and a CompuServe membership. To join, call 800 848-8199, or see your local computer dealer. If you're already a CompuServe member, type GO FAX at any ! prompt.

CompuServe®

Intel 2400B Modem 2

2400-bps PS/2 internal modem

PROS: Excellent Hayes compatibility, five-year warranty

CONS: Slightly more sensitive to phase and amplitude jitter than Hayes 2400

MultiTech MT224ES

2400-bps PS/2 internal modem

PROS: Hardware-based error correction and data compression, includes ProComm software

CONS: Not fully Hayes compatible

Despite its efforts to put everything but the kitchen sink on the PS/2 motherboard, IBM forgot a modem. Among the many internal modems now appearing to fill the gap are

two standouts: the \$445 Intel 2400B and the \$549 MultiTech MT224ES.

Both are more or less Hayes compatible, run at 2400 bps, and use the PS/2's speaker for audio output. But that's where the similarities end. The 2400B is a plain-vanilla modem with basic features and provides neither bundled software nor on-line freebies. The MT224ES, on the other hand, is loaded with extra features.

The MT224ES is, among other things, the first PS/2 modem to offer hardware-based MNP class 5 error correction and data compression. Used together, the techniques can boost the MT224ES's throughput to 4800 bps, provided the modem at the other end of the line also supports MNP class 5. Of course, you pay for the power. The MT224ES runs \$100 more than the 2400B.

The MT224ES includes a version of the popular *ProComm* communications package customized to access the modem's hardware-based protocol features. You also get discount coupons worth over \$400 in registration fees and on-line connect time.

While both modems support the Hayes AT command set, the 2400B does a better job, implementing all but one unimportant AT command. The MT224ES lacks support for 9 AT commands. To compensate, it provides 25 proprietary commands, most of which are related to its hardware-based protocols.

When it comes to assessing the Micro Channel's extended set of serial ports, the Intel 2400B wins hands down. While the MT224ES is limited to dialing out via COM1 through COM4, you can configure the 2400B to access COM1 through COM7 and thereby use a much wider range of serial port devices.

NSTL tests show the 2400B and MT224ES equal the Hayes Smartmodem 2400P in both software compatibility and performance. The Intel is a bit more sensitive to phase and amplitude jitter than the other two, but under normal conditions you'd never notice.

Choosing between the two modems is not easy. While the MT224ES's MNP capability, free software, and on-line discounts make a compelling package, its lack of full Hayes

FEATURES EVALUATION

Full-Featured 2400-bps Modems: Two Winners

The MultiTech MT224ES costs about \$100 more than Intel's 2400B but offers MNP hardware-based error correction and data compression. On the other hand, the 2400B boasts better Hayes compatibility.

	MultiTech MT224ES	Intel 2400B Modem 2	Hayes Smartmodem 2400P
Price	\$549	\$445	\$549
Switchless installation	●	●	●
Error correction	●	○	○
Data compression	●	○	○
Speaker volume knob	●	○	○
Phone number storage	●	●	●
Serial ports supported	4	7	6
Communications software included	●	○	●
On-line discounts included	●	○	●
Hayes compatibility	● ¹	●	●
Warranty (years)	2	5	2

¹ Fails to support nine AT commands.

Optical Winner



COREL WORM Drives

Compare the features and performance of a COREL Optical WORM with alternative storage options and you'll find that COREL wins hands down !

■ WORM vs Floppies

- 1000 times capacity
- Hard drive speed
- Rugged cartridges

■ WORM vs Tapes

- 12 times capacity
- Hard drive speed
- Much more reliable
- No drop out
- Withstands X-Rays

■ WORM vs Bernoullis

- 20 times capacity
- Lower cost/Mbyte
- Modern technology
- Multiple drive vendors

■ WORM vs Erasables

- Proven technology
- No accidental erasure
- Lower cost/Mbyte
- Ideal for archiving/audit
- Proven media
- Available NOW

■ Total PC Compatibility

COREL WORM drives are 100% PC compatible. Use them with all your existing applications and standard DOS commands just like your floppy drive.

■ "Plug and Play"

Everything you need is included: Drive, Software, Cable, and SCSI Interface Card and Manual. Your WORM can be running minutes after opening the box.

■ Low cost/Mbyte

Under \$15/Mbyte of on-line capacity. This is almost as low in cost as tape but with random access, greater reliability and longer life media.

■ Proven Software

COREL leads the way in PC compatible WORM drives with thousands of installations

■ Proven Hardware

COREL uses proven drive mechanisms from industry leaders such as Panasonic, Ricoh and Maxtor.

■ Hot Line Support

Just in case you have any problems, COREL provides Hotline and Bulletin Board support to help find the solution quickly and efficiently.

■ Dozens of Applications

- Databases
- Digitized music
- Archiving (15 yr.min. life)
- Back-up copies
- Multiple copies
- Graphics libraries
- CAD-CAM libraries
- Image files
- Software libraries
- Full-Text Retrieval
- LAN File servers
- Medical Imaging
- Audit trails
- CD-Rom development
- Data distribution
- Unix applications
- Workstation back-up
- Tape replacement
- Bernoulli replacement
- Security Systems
- Digitized voice
- Multi-media

■ Choices of Drive

Each COREL drive is a complete ready-to-go subsystem.

- **COREL PC400 \$2,895**
400 Mbyte capacity (2 x 200/side)
Cartridges \$99 each.
- **COREL PC600 \$3,795**
600 Mbyte capacity (2 x 300/side)
Cartridges \$180 each
- **COREL PC800 \$3,995**
800 Mbyte capacity (2 x 400/side)
Cartridges \$160 each.

■ Optional Developer's Kit

Allows easy modification of COREL software for custom applications

- **COREL SW76 \$1,500**

■ Other Systems Available

COREL has WORM subsystems for:

- Macintosh
- Novell LAN Fileservers
- 3COM LAN Fileservers
- UNIX (Available soon)
- Rugged Military

■ Order Now from COREL

No delays; you will receive your drive within a few days of your order. Call or Fax us now.

Circle 48 on reader service card



"Beware the March Ides!"

*They told Julius C
And he'd have known what was coming
If he'd had a PC.*

- ☐ 3 1/2" format available from us. Specify when ordering.
 - ☒ package includes both 5 1/4" and 3 1/2" disks.
 - ☒ 3 1/2" format available from manufacturer by request. Call us for details.
- CP—copy-protected; NCP—not copy-protected.

SOFTWARE

We only carry the latest versions of products. Version numbers in our ads are current at press time.

- Aldus ... NCP**
☐ PageMaker 3.0 call
- Alpha Software ... NCP**
☐ Advanced Keyworks 1.0 175.
☒ AlphaWorks 1.0 (integrated package) . . . 115.
☐ ALPHA/three 1.0 (dBase file compatible) . . . 219.
- American Small Business Computers**
☐ Design CAD 3.1 (NCP) . . . 159.
☐ Design CAD 3D 1.1 (NCP) . . . 159.
- Application Techniques ... NCP**
☒ Pizazz Plus 1.2 75.
- Ashton-Tate ... NCP**
☐ dBASE IV 1.0 call
☐ RapidFile 1.2 219.
☒ MultiMate Advantage II 1.0 299.
☐ Master Graphics 1.0 299.
☐ Framework III 1.0 459.
- Autodesk**
☐ Autosketch Standard 1.04 55.
- Barron's ... CP**
☒ SAT (Test preparation program) 35.
- Best Programs ... NCP**
☐ Label Master 3.1 (mailing label program) . . 29.
☐ Report Manager 5.0 199.
☐ Fixed Asset System 5.0 359.
- Bible Research ... NCP**
☐ The Word 4.2 (King James version) 159.
☐ The Word 4.2 (New International version) . 159.
- Bloc Publishing ... NCP**
☐ FormTool 2.01 55.
☐ Form Filler 1.5 89.
☐ Personal Lawyer 2.0 39.
☐ PopDrop 3.1 (manages your ram resident programs without rebooting) 39.
- Borland International ... NCP**
☒ Turbo C Professional Pack (includes assembler) 169.
☒ Turbo Pascal Professional Pack (includes assembler) 169.
☒ Paradox OS/2 1.0 479.
☒ Prolog 2.0 99.
☒ Turbo C 2.0 99.
☒ Turbo Pascal 5.0 99.

PC Connection Software Special

through March 31, 1989

Chipsoft ... NCP

☒ Turbo Tax Personal/1040

Turbo Tax, the award winning tax preparation software from Chipsoft, has been making filing your tax return fast and easy for the past five years. And this year's version is no exception. Included are over 40 forms, schedules, and worksheets, as well as an optional Visual 1040 mode.

- Pop-up calculator, notepad, and on-line IRS instructions
- Visual 1040 mode option allows you to fill out and view any form or schedule on screen
- New Auto-Interview to help you find the forms you need, and Data Examiner to help pinpoint omissions
- Prints IRS approved dot matrix 1040
- State tax packages also available

Turbo Tax Personal/1040 (for 1988 taxes). \$43.
State Packages Personal/1040 6.0 . each 32.
(3 1/2" available from mfr. upon request)

- ☒ Turbo Assembler & Debugger 1.0 \$99.
- ☒ Reflex 1.1 99.
- ☒ Sidekick Plus 1.0 135.
- ☒ Sprint 1.0. 135.
- ☒ Quattro 1.0 w/SQZ!Plus 1.0 165.
- ☒ Paradox 2.0 call
- ☒ Turbo Editor Toolbox 4.0 69.
- ☒ Turbo Database Toolbox 4.0 69.
- ☒ Turbo Basic Editor Toolbox 1.0 69.
- ☒ Turbo Basic Database Toolbox 1.0 69.
- ☒ Superkey 1.1 69.

Bourbaki ... NCP

- ☐ 1DIR+ 3.0. 49.

Bridgeway Publishing ... NCP

- ☐ FastTrax 3.9. 35.

Broderbund ... CP

- ☐ Print Shop 2.41 (incl. Graphics Library 1) 39.
- ☐ Memory Mate 3.01R (NCP) 45.

Chipsoft ... NCP

- ☒ TurboTax Personal/1040 6.0. special
- ☒ State Packages Personal/1040 6.0. special
- ☒ TurboTax Proseries/1040 5.0 229.

Chronos Software ... NCP

- ☒ Who•What•When (people, projects, time) 119.

Computer Associates ... NCP

- ☒ SuperCalc 5 1.0. 319.

Core International ... NCP

- ☐ Corefast 2.0. 95.

Crosstalk Communications ... NCP

- ☐ Remote² 1.01 \$95.
- ☐ Crosstalk XVI 3.7 95.
- ☐ Crosstalk MK.4 1.1 124.

Dac Software ... NCP

- ☐ Dac-Easy Payroll 3.0 59.
- ☐ Dac-Easy Light 1.0 45.
- ☐ Dac-Easy Accounting 3.0 59.

Delrina Technology ... NCP

- ☒ Per:FORM 1.0 159.

Digital Research ... NCP

- ☐ Gem Desktop 3.0 35.
- ☐ Gem Draw Plus 2.01 189.

5th Generation ... NCP

- ☒ Fastback Plus 2.01. 109.

Fox Software ... NCP

- ☒ Foxbase Plus 2.1 (single user) 209.
- ☒ Foxbase Plus 386 2.1. 319.

Funk Software ... NCP

- ☐ Sideways 3.21 (creates wide printouts) . . . 42.
- ☒ Worksheet Utilities 1.0 (1-2-3 utilities) . . . 59.
- ☒ Inword 1.0. 59.
- ☐ Allways 1.0 89.
- ☒ Noteworthy 1.0 49.

General Information ... NCP

- ☒ Hot Line Two 2.0 49.

Generic Software ... NCP

- ☐ Generic CADD Level 1 35.
- ☒ Generic CADD Level 2 55.
- ☒ Generic CADD Level 3 (now includes Dot Plot) 135.
- ☒ 3D Solids 2.2 189.
- ☒ Estimator 159.
- ☐ Basic Home Design 3.0. 35.
- ☐ CADD Starter Kit (contains Level 2, Home Design, Workbook tutorial, & sample disk) . 89.

Harvard Associates ... NCP

- ☒ PC Logo 3.0 59.

Hayes ... NCP

- ☒ Smartcom II 3.0. 89.

Hilgraeve Software ... NCP

- ☐ HyperACCESS 3.31 89.

Individual Software ... NCP

- ☒ Typing Instructor Encore 2.13 26.
- ☐ Professor DOS 2.51 (with Smartguide) . . . 33.
- ☒ 101 Macros for 1-2-3, WordPerfect, and others each 42.

Intuit ... NCP

- ☒ Quicken 2.0. 35.

Javelin ... NCP

- ☒ Javelin Plus 2.02 249.

Lotus ... NCP

- ☒ Agenda 1.0 289.
- ☐ 1-2-3 2.01 (upgrade free to version 3.0) . . . call
- ☐ Freelance Plus 3.0. call
- ☐ Symphony 2.0. call
- ☒ Manuscript 2.0 359.

For IBM Personal Computers exclusively.

PC CONNECTION®

If he'd had good projections

*They couldn't cut him down
For before the cock crowed
He'd have been out of town.*

MECA ... NCP	
☐ Checkwrite Plus 1.0	\$29.
☐ Financial Calculator 1.0	33.
☐ Managing Your Money 5.0	119.
☐ Andrew Tobias' Tax Cut 1040	49.
Meridian Technology ... NCP	
☐ CarbonCopy Plus 5.0	115.
Micro Logic ... NCP	
☐ Tornado 1.8	55.
Microlytics ... NCP	
☐ GOfer 1.0 (text retrieval system)	45.
☐ Wordfinder 4.0 (electronic thesaurus)	special
MicroPro ... NCP	
☐ WordStar Professional Release 5	259.
☐ WordStar 2000 Plus Rel. 3 (Personal Ed.)	259.
Microrim ... NCP	
☐ R:BASE for DOS (version 2.1)	449.
☐ R:Base for OS/2	599.
Microsoft ... NCP	
☐ Learning DOS 2.0 (for any DOS version)	35.
☐ Windows 286 2.1	69.
☐ Windows 286 2.1 w/Mouse	145.
☐ Works 1.05	99.
☐ Windows 386 2.1	129.
☐ Word 5.0	call
☐ Chart 3.0	259.
☐ Excel 2.1 (requires 80286/80386 CPU)	239.
CD-ROM	
☐ Bookshelf 1.0 w/Amdek Laser Drive	799.
☐ Programmers Library 1.0	269.
LANGUAGES	
☐ Quick BASIC 4.5	69.
☐ Quick C 2.0	69.
☐ Macro Assembler 5.1	99.
☐ Basic Compiler 6.0	199.
☐ Pascal 4.0	199.
☐ Fortran 4.1	289.
☐ C Compiler 5.1	299.
☐ Cobol 3.0	599.
Monogram ... NCP	
☐ Dollars and Sense 3.1	105.
Nantucket Software ... NCP	
☐ Clipper (Summer '87, dB3 Plus compiler)	429.
New England Software ... NCP	
☐ Graph-in-the-Box Release 2	75.
☐ GB-Stat 1.0	159.
☐ GB Analytic 1.0	105.
Nolo Press ... NCP	
☐ WillMaker 3.0	35.
North Edge Software ... NCP	
☐ Timeslips III 3.3	119.
Owl International ... NCP	
☐ Guide 2.0	143.
Paperback Software ... NCP	
☐ VP-Info 1.4	65.
☐ VP-Planner Plus 2.0	145.
☐ VP-Expert 2.0	145.

PC Connection Software Special

through March 31, 1989

Software Publishing ... NCP

- ☐ Harvard Graphics 2.12
- ☐ Harvard Graphics Accessories Master Pack

Show off your own custom reports, overhead transparencies, slides, or any on-screen presentation with Software Publishing's Harvard Graphics. Some of its capabilities include:

- Creating your own charts from scratch or choosing one that's pre-formatted
- Reading 1-2-3 graphs and data or any ASCII file
- Incorporating symbols, drawings, etc., from the Harvard Graphics Accessories Master Pack (including Business Symbols, Designer Gallery, Map Maker, Quickchart, and Screenshow)

Harvard Graphics 2.12 (3 1/2" included) \$289.
Harvard Graphics Accessories Master Pack (3 1/2" included) 289.

Paul Mace ... NCP

- ☐ H/Test-H/Format 2.0 (hard-disk tools) \$49.
- ☐ Mace Utilities 5.0 (DOS utilities) 55.
- ☐ Mace Gold 1.0 79.
- ☐ Grasp 3.1 79.
- ☐ Nvelope 1.02 29.

PC Support Group ... NCP

- ☐ Lightning 4.82 39.
- ☐ Lucid 3-D 1.22 75.

Personics ... NCP

- ☐ SmartNotes 2.0 49.
- ☐ SeeMORE 1.02 49.
- ☐ Look&Link 1.01 59.
- ☐ Ultravision 1.1 79.
- ☐ @BASE 1.21 119.

Peter Norton ... NCP

- ☐ Norton Editor 1.3 39.
- ☐ Norton Commander 2.0 45.
- ☐ Advanced Utilities 4.5 79.
- ☐ Dan Bricklin's Demo Program 2 99.

1-800/243-8088



PC Connection
6 Mill Street
Marlow, NH 03456

SALES 603/446-7721 FAX 603/446-7791

Quarterdeck ... NCP

- ☐ Expanded Memory Manager 4.2 \$39.
- ☐ DESQView 2.2 79.
- ☐ DESQView 386 1.0 115.

Reference Software ... NCP

- ☐ Grammatik III 1.06 (electronic proofreader) 52.
- ☐ Reference File 1.0 (pop-up DB manager) 49.

Relay Communications

- ☐ Relay Gold 3.0 149.

Revolution Software ... NCP

- ☐ VGA Dimmer 2.01 (screen saver) 19.
- ☐ DJ 1.5 (disk manager) 39.
- ☐ Cruise Control 3.02 39.

Rightsoft ... NCP

- ☐ Rightwriter 3.0 54.

Simon & Schuster ... NCP

- ☐ Professional Thesaurus 1.0 79.
- ☐ Typing Tutor IV 33.

Softlogic Solutions ... NCP

- ☐ Software Carousel 2.02 49.
- ☐ Disk Optimizer 4.01 (w/Data Guardian) 45.
- ☐ @Liberty 1.1 119.
- ☐ Cubit 2.02 45.
- ☐ Double DOS 4.02 45.
- ☐ Magic Mirror 1.0 59.

SoftView ... NCP

- ☐ TaxView (for 1988 taxes) 69.

Software Publishing ... NCP

- ☐ Professional Plan 1.01 59.
- ☐ PFS:First Publisher 2.0 79.
- ☐ PFS:First Graphics 1.0 95.
- ☐ PFS:First Choice 3.01 99.
- ☐ Professional Write 2.0 125.
- ☐ Professional File 2.0 189.
- ☐ Office Writer 6.0 259.
- ☐ Harvard Graphics 2.12 special
- ☐ Harvard Graphics Accessories Pack special
- ☐ Harvard Project Manager 3.0 439.

Spinnaker ... NCP

- ☐ Resume Kit 1.0 25.
- ☐ Eight-in-One 1.1 39.
- ☐ Splash 1.0 59.
- ☐ Pinstripe Presenter 1.0 115.

Springboard ... NCP

- ☐ Newsroom Pro 1.0 45.
- ☐ Certificate Maker 34.
- ☐ Clip Art 1 or 3 each 19.
- ☐ Clip Art 2 25.
- ☐ Clip Art 3 19.

Symantec ... NCP

- ☐ SQZ!Plus 1.11 69.
- ☐ 4Word 2.0 69.
- ☐ Q & A Write 1.01 135.
- ☐ Grandview 1.0 195.
- ☐ Q & A 3.0 (database, word processor) 235.
- ☐ Breakthrough Timeline 3.0 395.
- ☐ Spreadsheet Analyst 2.5 99.

For IBM Personal Computers exclusively.

PC CONNECTION®

ALL ITEMS SUBJECT TO AVAILABILITY. PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

He'd have studied their looks

*So hungry and lean
And with a good database
Would know what they mean.*

- ▣ Note-It Plus 1.02 \$55.
- ▣ Think Tank 2.4NP 135.

T/Maker ... NCP

- ▣ Scrapbook+ 1.0 79.
- ▣ ClickArt Business Images 42.
- ▣ ClickArt Holidays 42.
- ▣ EPS (PostScript) Illustrations 79.

The XTREE Co. ... NCP

- ▣ XTREE Pro 1.0 69.
- ▣ Hot 4.0 95.

TOPS ... NCP

- Flashcard (AppleTalk network card;
1 year warranty) 169.
- NetPrint 2.0 (share printers) 119.
- TOPS 2.0 119.
- TOPS Repeater (extends network) 132.

Traveling Software ... NCP

- Battery Watch 1.0 (3 1/2" only) 27.
- ▣ Laplink Mac 2.0 (Mac-PC transfer) 79.
- ▣ Laplink Plus 2.1 85.
- ▣ Desklink 2.21 99.

True BASIC, Inc. ... NCP

- ▣ True BASIC 2.03 (now includes Runtime) . . 57.
- ▣ 3-D Graphics 45.

Vericom ... NCP

- ▣ SoftBytes 2.0 35.

WordPerfect Corp. ... NCP

- ▣ WordPerfect Library 2.0 69.
- ▣ WordPerfect 5.0 239.
- ▣ WordPerfect 5.0 Addit'l Network Stations . . 84.
- ▣ WordPerfect Office 2.0 269.
- ▣ WordPerfect Office 1.0 Addit'l Network Stations 84.
- ▣ WordPerfect Network Server 5.0 349.
- ▣ WordPerfect Executive 129.
- ▣ DataPerfect 1.0 299.

Wordtech ... NCP

- ▣ DBXL 1.2 119.

Xerox ... NCP

- ▣ Ventura Publisher 2.0 call
- ▣ Professional Extensions
(reqs. Ventura Publisher) call

XYQUEST ... NCP

- ▣ XyWrite III Plus 3.54 w/A-la-Carte Menus . 239.
- ▣ XyWrite III Plus Network Server 3.54 399.

RECREATIONAL/EDUCATIONAL

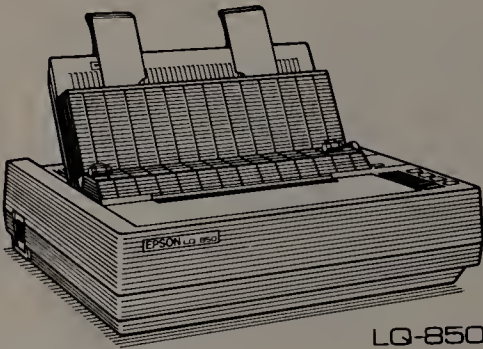
Accolade ... CP (reqs. graphics brd.)

- ▣ Bubble Ghost 22.
- ▣ Mean 18 29.
- ▣ Hardball (baseball simulation) 11.
- ▣ Testdrive (driving simulation) 24.
- ▣ Jack Nicklaus' 18 Greatest Holes 29.
- ▣ Grand Prix 22.
- ▣ 4th & Inches (football simulation) 22.

Broderbund ... CP

- ▣ Where in the World is Carmen SanDiego? 25.

**PC Connection
Hardware Special**
through March 31, 1989



LQ-850

Epson ... 1 year
Epson LQ-850

- 80 column printer with print speeds of 264 cps draft and 88 cps letter quality (12 cpi mode)
- SelecType control panel offers quick, easy selection of typestyles, font, and pitch
- Includes both parallel and serial interfaces, 6k buffer, and push tractor
- Full 1 year limited warranty

Epson LQ-850 call

- ▣ Where in the USA is Carmen SanDiego? . \$25.

- ▣ Where in Europe is Carmen SanDiego? . . 29.

- ▣ Toy Shop 39.

- ▣ Ultima IV 35.

- ▣ Ultima V 39.

Electronic Arts ... CP (reqs. graphics brd.)

- ▣ One-on-One/Bird vs Jordan 29.

- ▣ Chuck Yeager's Flight Trainer 32.

- ▣ Chessmaster 2100 32.

- ▣ Earl Weaver Baseball 32.

- ▣ Heroes of the Lance 29.

- ▣ Empire 35.

- ▣ Mavis Beacon Teaches Typing 35.

- ▣ Sentinel Worlds 39.

- ▣ Bard's Tale II 39.

- ▣ Grand Slam Bridge 45.

Infocom ... NCP

- ▣ Zork Trilogy 33.

Microprose ... CP

- ▣ F-19 Stealth Fighter (requires CGA or EGA) 39.

- ▣ F-15 Strike Eagle (requires CGA) 22.

- ▣ Gunship (requires CGA or EGA) 32.

Microsoft ... NCP

- ▣ Flight Simulator 3.0 (reqs. graphics brd.) . 35.

Mindscape ... CP

- ▣ Colony 1.0 30.

- ▣ Balance of Power 33.

- ▣ Balance of Power 1990 30.

One Step Software ... NCP

- ▣ Golf Doctor 1.1 (improve your game) . . . \$33.

- ▣ Golf's Best Pinehurst #2 4.0 (play the best). 12.

- ▣ Golf Statkeeper 1.0

(includes USGA Handicapper) 27.

- ▣ 19th Hole Special

(3 Golf programs above bundled with

Mr. Boston Micro Bartender's Guide) 79.

- ▣ Mr. Boston Official Micro Bartender's Guide . . 18.

- ▣ Micro Video Companion 1.0 24.

- ▣ Take Control of Cholesterol 2.0 24.

Parlor Software ... CP

- ▣ Bridge Parlor 2.3 49.

Sierra On-Line ... CP

(All require Hercules, CGA or EGA)

- ▣ Leisure Suit Larry 25.

- ▣ Leisure Suit Larry II 33.

- ▣ Space Quest II 33.

- ▣ King's Quest IV (512k version) 33.

- ▣ Manhunter 33.

- ▣ Police Quest 33.

- ▣ Police Quest II 33.

- ▣ 3D Helicopter 33.

Simon & Schuster

- ▣ Star Trek: Rebel Universe 29.

Spectrum Holobyte ... NCP

- ▣ Orbiter (shuttle simulation) 25.

- ▣ GATO (submarine simulation) 12.

- ▣ Tetris (addicting mind teaser) 24.

- ▣ Falcon (F-16 simulation, reqs. graphics brd.) 32.

Spinnaker ... CP

- ▣ Sargon III (chess game) 15.

- Kids on Keys (ages 3 to 9) 19.

- ▣ Facemaker Gold (ages 3 to 8) 25.

- ▣ Kindercomp Gold (ages 3 to 8) 25.

- ▣ Kidwriter Gold (ages 6 to 10) 32.

- ▣ Homework Helper—Math (grades 7-12) . . 32.

- ▣ Homework Helper—Writing (grades 7-12) . 32.

Stone & Assoc. ... NCP (reqs. graph. brd.)

- ▣ Algebra Plus (ages 13 to adult) 27.

- ▣ Memory Master (ages 2 to 6) 22.

- ▣ My Letters, Numbers, Words (2 to 6) 22.

- ▣ Second Math (ages 7 to 16) 27.

Sublogic ... NCP

- ▣ Jet 2.1 (requires EGA or CGA) 33.

- ▣ Scenery Disks each 15.

- ▣ San Francisco Star Scenery Disk 18.

- ▣ Japan Scenery Disk 15.

- ▣ Up Periscope 19.

The Learning Company ... CP

- ▣ Math Rabbit (ages 4 to 7) 26.

- ▣ Reader Rabbit (ages 4 to 7) 26.

- ▣ Writer Rabbit (ages 6 to 12) 26.

True BASIC, Inc. ... NCP

- ▣ Kemeny/Kurtz Math Series 32.

XOR ... NCP

- ▣ NFL Challenge 2.0 69.

For IBM Personal Computers exclusively.

PC CONNECTION®



PC Carnival.

Revel without a Claus.

In the festive town of Marlow, NH (pop. 557), the holiday spirit lasts long after Santa's packed it in for the year. In fact our sure-pawed mascots are already preparing for their annual Winter Carnival – a seasonal celebration featuring skating, sledding, sleigh rides and ice sculpture. This annual event certainly provides a welcome break from our usual winter sports, e.g. thawing frozen pipes, jump starting cars, putting out chimney fires, and skidding off the road into ten foot snow drifts.

Breaking the mold.

(Or, where's the P word?)

Our more loyal and linguistically-inclined customers may have noticed that we've abandoned the "P" words in our headlines in favor of the "C" words. Because after five years of parading a profusion of P patter past PC pros on periodical pages, we perceived that perhaps they paled next to the possibilities and potential

of creative constructions consisting of C words. 'Nough said. Rest assured, though, our letter-perfect mascots still stand (and occasionally sit, roll over, and do handstands) for everything true and noble in the microcomputer mail order marketplace. If you're looking for a single source for superior savings, sensational tech support, and specially speedy shipping, we're definitely your Connection.

The ice mammal cometh.

Wouldn't you like to wake up every morning to a vision of microcomputing's most magnificent mammal? Well, now you can do that *and* quench your thirst for a taste of Marlow's winter wonderland with your very own PC Connection mug. It features a crystal-clear likeness of our oh-so-cool, but heartwarming mascot, and is free to anyone who places an order of \$500 or more between now and March 31st.

Just call 1-800/243-8088 or 1-603/446-3383, M-F 9:00 to 9:00; Saturday to 5:30. If you're planning to visit please call ahead.



Warm the cockles of your heart with a PC Connection mug featuring the mascot who never skates on thin ice. Offer not available to net accounts. One per customer.

For IBM Personal Computers exclusively.

PC CONNECTION®

E tu compute

*Can you see what's in view?
Just lend us your ears
And we'll help see you through.*

HARDWARE

Manufacturer's standard limited warranty period for items shown is listed after each company name. Some products in their line may have different warranty periods.

AST Research ... 2 years

I/O Mini 2 C/S/P	\$89.
SixPakPlus 64k C/S/P (upgrades to 576k)	129.
Advantage Premium 512k S/P (upgrades to 1 Meg or 2 Meg w/Piggyback)	369.
Advantage 2-386 (for PS/2 Model 80)	call
RAMpage Plus 286 512k (for XT286/AT)	539.
RAMpage Plus MicroChannel 512k (for PS/2 Models 50/60)	539.

Amdek ... 90 days

LaserDrive-1 (external CD-ROM Drive)	629.
LaserDrive-2 (internal CD-ROM Drive)	629.

Compucable ... 2 years

2-Position switch box	29.
3-Position switch box	39.

Cuesta ... 1 year

Datasaver 400 Watt	
Standby power backup unit for the AT	459.

Curtis ... lifetime

ACCESSORIES

Curtis Clip CC-1	6.
Disk Holder DB-1 (holds 50 5 1/4" disks)	8.
3 1/2" Disk Holder DB-2 (holds up 40 disks)	8.
Printer Stand PS-1	18.
Universal System Stand SS-3	25.
Toolkit TK-1	25.

CABLES

Smartmodem-to-PC Cable EC-7 (9 feet)	17.
Printer-to-IBM cable EC-6 (9 feet)	17.

SURGE SUPPRESSORS

Filtered SafeStrip SPF-3	21.
Diamond SP-1 (6 outlets)	29.
Emerald SP-2	36.
Ruby SPF-2	

6 outlets; EMI/RFI filtered; 6 ft cord) 55.

Ruby-Plus SPF-2 Plus

w/FAX & modem protection) 69.

DCA ... 1 year

Ima 2 (3270 emulation board)	729.
Ima 2 Micro Channel	

for PS/2 Models 50/60/70/80) 729.

Epson ... 1 year

We are an authorized Epson Service Center.

FX-850 (80 col., 264 cps, 9 pin) call

FX-1050 (136 col., 264 cps, 9 pin) call

LQ-500 (80 col., 180 cps, 24 pin) call

LQ-850 printer (80 col., 264 cps, 24 pin) call

LQ-1050 printer (136 col., 264 cps, 24 pin) call

PC Connection Hardware Special

through March 31, 1989

Hayes ... 1 year thru PC Connection
Personal Modem 1200 w/Smartcom EZ

Designed for unsurpassed ease of setup and operation, this home telecommunications system provides a complete solution. The compact size and sophisticated design of this new Hayes modem offers reliable communications and state-of-the-art technology, all at an affordable price.

- Personal Modem 1200 plugs into a standard wall outlet, eliminating the need for a separate power supply
- Attached cable included with 9 and 24-pin adapters for easy connection to your PC
- Smartcom EZ Software makes communications easy, with menus and a "phone book" for storing frequently called numbers

Hayes Personal Modem 1200 w/Smartcom EZ (3 1/2" and 5 1/4" included) \$145.

LQ-2550 printer (136 col., 400 cps, 24 pin)	call
LX-800 printer (80 col., 180 cps, 9 pin)	call
Printer-to-IBM cable (6 feet)	15.

Everex ... 1 year

1200 Baud Internal Modem	79.
2400 Baud Internal Modem	149.

5th Generation ... 1 year

Logical Connection 256k	449.
Logical Connection 512k	499.

Hayes ... 2 years

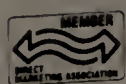
Personal Modem 1200 (with Smartcom EZ; 1 yr. wrty thru PC Connection) special

Smartmodem 1200	289.
Smartmodem 1200B (with Smartcom II)	289.
Smartmodem 1200B (hardware only)	259.
Smartmodem 2400	429.
Smartmodem 2400B (with Smartcom II)	429.
Smartmodem 2400B (hardware only)	399.

Hercules ... 2 years

Graphics Card Plus	189.
--------------------	------

1-800/243-8088



PC Connection

6 Mill Street

Marlow, NH 03456

SALES 603/446-7721 FAX 603/446-7791

Intel ... 5 years

2400B Modem (internal modem for IBM-PC/XT/AT)	\$239.
---	--------

2400B Modem 2 (internal modem for PS/2 Models 50/60/80)	269.
---	------

Inboard 386/PC w/1 Meg	729.
------------------------	------

Inboard 386/PC Piggyback Card w/4 Meg	1699.
---------------------------------------	-------

Inboard 386/AT (req. installation kit)	899.
--	------

Inboard Installation Kit (specify computer)	139.
---	------

Above Board Plus 512k	429.
-----------------------	------

Above Board 2 Plus 512k	479.
-------------------------	------

Above Board Plus I/O 512k	529.
---------------------------	------

Connection Coprocessor (FAX board plus)	769.
---	------

Optional 2400 Baud Modem for Connection Coprocessor	229.
---	------

MATH COPROCESSORS

8087 (for IBM-PC & XT)	95.
------------------------	-----

8087-2 (8 MHz, for PS/2 Models 25 & 30)	139.
---	------

80287 (for AT & XT286)	149.
------------------------	------

80287-8 (for 8 MHz 80286 machines)	219.
------------------------------------	------

80287-10 (for PS/2 Models 50 & 60)	259.
------------------------------------	------

80387 (for 16 MHz PS/2 Model 80)	399.
----------------------------------	------

80387-20 (for 20 MHz PS/2 Model 80)	459.
-------------------------------------	------

Kensington Microware ... 1 year

Masterpiece	94.
-------------	-----

Masterpiece Plus	109.
------------------	------

Key tronic ... 3 years

101 Keyboard	99.
--------------	-----

101 Plus Keyboard (enhanced layout)	99.
-------------------------------------	-----

Kraft ... 5 years

Three-button Joystick	33.
-----------------------	-----

High Speed Joystick Adapter Card	25.
----------------------------------	-----

Adapter Card/3-Button Joystick Bundle	49.
---------------------------------------	-----

KYE International ... lifetime

Dyna Mouse GM6+ (w/Dr. Halo III)	54.
----------------------------------	-----

Logitech ... lifetime

Series 2 Mouse (for PS/2 50/60/70/80)	65.
---------------------------------------	-----

HiREZ Mouse (bus only)	89.
------------------------	-----

Mouse w/Paint Show (bus or serial)	95.
------------------------------------	-----

Mouse w/LogiCAD (bus or serial)	119.
---------------------------------	------

ClearCase Mouse (serial only)	99.
-------------------------------	-----

ScanMan (hand held scanner)	199.
-----------------------------	------

Magnavox ... 2 years

14" VGA Monitor (9CMO62)	389.
--------------------------	------

14" VGA Monitor (9CMO82)	449.
--------------------------	------

VGA Adapter (9AV500)	249.
----------------------	------

14" Hi-Res Monitor (9CMO53)	369.
-----------------------------	------

Microsoft ... 2 Years

Mach 20 (1 yr. wrty)	349.
----------------------	------

Disk + Option (for Mach 20; 1 yr. wrty.)	69.
--	-----

Memory + Option (for Mach 20; 1 yr. wrty.)	339.
--	------

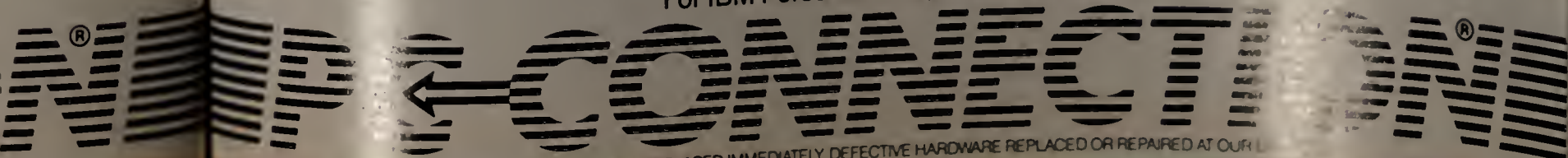
Mouse with Paint Show (bus or serial)	109.
---------------------------------------	------

Mouse with LogiCAD (bus or serial)	125.
------------------------------------	------

MSC Technology ... lifetime

OmniMouse (1 yr. warranty)	57.
----------------------------	-----

For IBM Personal Computers exclusively.



*DEFECTIVE SOFTWARE REPLACED IMMEDIATELY DEFECTIVE HARDWARE REPLACED OR REPAIRED AT OUR DISCRETION

For Caesar and the others

*Are probably pledgin'
That the next time they'll consult
With PC Connection.*

PC Mouse II w/PC Paint+ (bus or serial) . . .	\$89.
PC Mouse II w/Autosketch (bus or serial) . . .	105.
NEC ... 2 years	
Multisync II (800 x 560 max. resolution) . . .	599.
NSI Logic ... 1 year	
Smart VGA (supports full VGA specs)	239.
Orchid Technologies ... 2 years	
Tiny Turbo 286 (accelerator board)	289.
ProDesigner VGA (800x600 VGA Mode)	319.
RAMquest Xtra 16/32 □	339.
PC Power & Cooling Systems ... 1 year	
REPLACEMENT POWER SUPPLIES	
Turbo Cool 150 (run 25° - 40° cooler)	129.
Turbo Cool 250 (run 25° - 30° cooler)	169.
Silencer 150 (84% noise reduction)	115.
Silencer 200 (69% noise reduction)	149.
Turbo Cool 375	299.
PC Support Group ... 1 year	
Breakthrough 286 Accel. Board (8 MHz)	299.
Breakthrough 286 Accel. Board (12 MHz)	449.
Practical Peripherals ... 5 years	
1200 Baud Internal Modem (w/ProComm)	69.
1200 Baud External Modem (mini)	79.
Microbuffer Inline (par. print buffer/32k)	135.
2400 Baud Internal Modem	159.
2400 Baud External Modem	189.
Princeton Graphics ... 1 year	
Ultrasync (supports CGA, EGA, VGA)	549.
Max15 Monochrome Monitor	269.
Safe Power Systems ... 2 years	
Safe 250W (standby power backup)	249.
Safe 425W (standby power backup)	369.
Toshiba ... 1 year	
P321SL printer (80 col., 216 cps, w/tractor)	529.
T1000 Laptop (80C88, 6.4 lbs., 5 hr. battery)	call
T1200 Laptop (80C86, 10 MHz, 20 Meg)	call
T1200HB Laptop w/Backlit screen	call
T1200FB Laptop Dual Floppy System w/Backlit screen	call
T3200 Laptop (80286, 12 MHz, 40 Meg)	call
T5100 (80386, 16 MHz, 40 Meg)	call
768k RAM Card for T1000	299.
Video 7 ... 5 years	
VEGA Deluxe (supports 640x480)	219.
VEGA VGA (supports full VGA specs)	287.
FastWrite VGA (800x600 max. resolution)	379.
VRAM VGA (1024x768 max. resolution)	529.

DRIVES

Alloy ... 1 year	
Tape System/2 (for PS/2 MicroChannel)	299.
Retriever/40 (for IBM AT & compatibles)	349.
IOMEGA ... 1 year	
Dual 20 Meg Bernoulli Box (8")	1679.

20 Meg Cartridge (8")	\$82.
20 Meg Tripak (8")	244.
Bernoulli II Single 20 Meg Internal (5 1/4")	767.
Bernoulli II Dual 20 Meg External (5 1/4")	1659.
20 Meg Cartridge (5 1/4")	59.
20 Meg Tripak (5 1/4")	169.
PC2 Card	169.
PC2B Card (bootable card for PC/XT/AT)	229.
PC4 Card (for PS/2 Model 50/60/70/80)	299.
Mountain Computer ... 1 year	
40 Meg Internal Tape Drive (XT, AT or PS/2)	379.
40 Meg External Tape Drive (XT, AT or PS/2)	479.
40 Meg External Tape Drive w/Power Supply (XT, AT, or PS/2)	569.
Plus Development ... 2 years	
Hardcard 20 Meg (49 ms)	549.
Hardcard 40 Meg (28 ms)	699.
Passport (20 or 40 Meg removable drives)	call
Seagate ... 1 year	
FREE PCTV® Hard Drive Installation Tape with the purchase of 20, 30 or 40 Meg Seagate drive for the IBM PC (not for AT). Specify Beta or VHS.	
<u>20 Meg Internal Hard Drive ST225 (w/controller and cables, 65 ms)</u>	299.
<u>30 Meg Internal Hard Drive ST238 (w/controller and cables, 65 ms)</u>	329.
<u>40 Meg Internal HD ST251 for AT (40 ms)</u>	399.
<u>40 Meg Internal HD ST251 for XT (w/controller and cables, 40 ms)</u>	449.
<u>40 Meg Internal HD ST251-1 for AT (28 ms)</u>	449.
<u>80 Meg Internal HD ST4096 for AT (28 ms)</u>	669.
TEAC ... 1 year	
PC, XT 360k Drive (5 1/4" half-height)	89.
720k Drive (3 1/2" half-height, specify XT or AT)	95.
1.44 Meg Drive for AT (3 1/2" half-height, includes Bastech software utilities)	119.
Toshiba ... 1 year	
AT 360k Drive (5 1/4" half-height)	89.
AT 1.2 Meg Drive (5 1/4" half-height)	99.
AT 1.44 Meg Drive (3 1/2" half-height, includes Bastech software utilities)	119.

DISKS

All disks have a lifetime warranty.	
5 1/4" DS/DD Disks for PC & XT (360k)	
Fuji MD2D (10 disks per box)	12.
Sony (10 disks per box)	12.
Maxell MD2-D (10 disks per box)	13.
Verbatim Datalife (10 disks per box)	13.
5 1/4" DS/High Density Disks for AT (1.2 Meg)	
Fuji MD2HD (10 disks per box)	22.

Sony (10 disks per box)	\$23.
Maxell MD2-HD (10 disks per box)	23.
Verbatim Datalife (10 disks per box)	22.
3 1/2" DS/DD Diskettes (720k)	
Sony (10 disks per box)	19.
Fuji (10 disks per box)	19.
Verbatim (10 disks per box)	19.
Maxell (10 disks per box)	20.
3 1/2" DS/High-Density Diskettes (1.44 Meg)	
Sony (10 disks per box)	55.
Fuji (10 disks per box)	55.
Verbatim (10 disks per box)	55.
Maxell (10 disks per box)	59.

MISCELLANEOUS

CompuServe	
CompuServe Information Service	24.
Grolier's OnLine Encyclopedia	19.
Cables ... lifetime	
Smartmodem-to-AT cable (9 feet)	15.
Parallel Printer cable (15 feet)	19.

OUR POLICY

- We accept VISA and MASTERCARD only.
- No surcharge added for credit card orders.
- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order (in the U.S.).
- No sales tax.
- All U.S. shipments insured; no additional charge.
- APO/FPO orders shipped 1st Class Mail, charged by weight.
- Allow 1 week for personal and company checks to clear.
- COD max. \$1000. Cash, cashier's check, or money order.
- 120 day limited warranty on all products. *
- To order, call us Monday through Friday 9:00 to 9:00, or Saturday 9:00 to 5:30. You can call our business offices at 603/446-3383 Monday through Friday 9:00 to 5:30.

SHIPPING

Note: Accounts on net terms pay actual shipping.

Continental US:

- For monitors, printers, Bernoulli Boxes, computers, and hard drives, pay actual charges. Call for UPS 2nd-Day & Next-Day-Air.
- For all other items, add \$3 per order to cover UPS Shipping. For such items, we automatically use UPS 2nd-Day-Air at no extra charge if you are more than 2 days from us by UPS ground.

Hawaii:

- For monitors, printers, Bernoulli Boxes, and computers, actual UPS Blue charge will be added. For all other items, add \$3 per order.

Alaska and outside Continental US:

- Call 603/446-3383 for information.

For IBM Personal Computers exclusively.

PC CONNECTION®

NSTL TEST REPORT

Two New 2400 PS/2 Modems Equal Hayes Performance

The MultiTech MT224ES and the Intel 2400B internal 2400-bps modems perform well enough to stand up to the Hayes Smartmodem 2400.

Originate mode

Signal-to-white-noise ratio

Impairment level	10:1	11:1	12:1	13:1	14:1	15:1	16:1	17:1	18:1	19:1
Hayes Smartmodem 2400	—	—	—	98	61	29	14	2	4	0
Intel 2400B Modem 2	—	—	—	—	56	—	7	6	0	0
MultiTech MT224ES	—	1	—	—	73	38	12	8	0	0

— means "no connect."

Phase jitter

Impairment level (in degrees)	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18
Hayes Smartmodem 2400	93	84	89	66	67	63	45	31	30	18	14	7	4	4	3	2	1	0
Intel 2400B Modem 2	9	9	7	—	82	77	63	52	41	37	24	16	13	9	5	2	3	0
MultiTech MT224ES	9	91	78	79	66	52	41	38	26	16	10	7	7	5	0	0	2	0

Amplitude jitter

Impairment level (in percent)	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19
Hayes Smartmodem 2400	81	80	71	59	50	33	18	13	8	3	4	3	0	0	0	0	0
Intel 2400B Modem 2	—	86	84	76	57	45	40	29	18	14	7	7	1	1	1	2	0
MultiTech MT224ES	84	70	64	50	39	24	18	9	9	2	1	1	0	0	0	0	0

errors

100-91 90-81 80-71 70-61 60-51 50-41 40-31 30-21 20-11 10-1

NSTL tested each modem's ability to transmit data accurately over noisy telephone lines using the TAS 1010 VoiceBand Channel Simulator. The system includes the Network Simulator, which mimics public and leased lines, and the Modem Test Unit, which automatically runs desired data back and forth between the test modem and a control Hayes Smartmodem 2400 and calculates resulting data transmission errors. In these tests, 10K simulated test files in 100-byte blocks were received by each examined modem and the block errors measured and reported. All tests were performed in originate mode. Starting values for the

key impairments tested—white noise, phase jitter, and amplitude jitter—were based on AT&T Bell Labs' 1982-1983 *End Office Connection Study*. White-noise impairments ranged from 10:1 to 19:1. An impairment was lessened one step at a time to determine the point at which a modem could correct all the errors in a transmitted block. (In the MultiTech MT224ES white-noise test, for example, at the 13:1 signal-to-noise ratio, an average of 97 out of every 100 blocks contained errors. The error rate dropped to 0 at 18:1.)

Phase jitter tests were conducted in the same manner; phase jitter intensities spanned 35 de-

grees to 18 degrees. In the amplitude jitter tests, the intensity of the impairment ranged from a maximum of 35 percent to 19 percent.

Note: The impairments encountered on average phone lines are much lower, and these modems should have no difficulty communicating under normal circumstances. The average signal-to-white-noise ratio is 34:1; phase jitter is 8 degrees; and amplitude jitter, 4 percent.

Data based on tests designed and conducted by National Software Testing Laboratories (NSTL). All rights reserved.

compatibility could prove troublesome. The 2400B's lower price, five-year warranty, and superior Hayes compatibility give it the edge. —TJ Byers

WHERE TO BUY

Intel 2400B Modem 2

Intel Corp.
5200 N.E. Elam Young Pkwy.
Hillsboro, OR 97124
503/629-7354

List price: \$445

Accessories: none

Warranty: five years parts and labor

Extended warranty: none

Technical support: toll-free number, M-F 7-5

Other support services: 24-hour BBS

For more information, circle 693 on reader service card.

omniPAGE™

Customer Profile

Regis McKenna

Age: Old enough to remember the day that Intel Corporation was founded.

Profession: Chairman of Regis McKenna Inc., a major marketing company based in "Silicon Valley." A general partner in the venture capital firm of Kleiner Perkins Caufield & Beyers. Author of the *Regis Touch* and most recently, *Who's Afraid of Big Blue?**

Hobbies: Enjoys doing extensive research on innovative new technologies. He recently became involved in building and archiving an extensive database, using state-of-the-art page recognition software.

His Page Recognition Software: *OmniPage* of course. According to Regis: "*OmniPage* represents one of the most complete page recognition software products; providing incredible flexibility to customize data which can be easily accessed later. All of a sudden the cost of archiving and retrieving data has dropped significantly. The 'Information Age' is upon us and we have an exciting new tool."

Favorite Quote: The New York Times: "*OmniPage* could be the most significant advance in personal computing this year."

Things Disliked Most: "Technology that is not easily accessible or powerful enough to serve the needs of people."

Favorite Scan: "I'm using *OmniPage* to build an extensive electronic library that pertains to the growth and evolution of technology over the past 25 years. Being able to scan literally any article, regardless of layout or column format, has suddenly made this all possible. It's eliminated the labor intensive task of data entry. I'll be able to share this information with employees, customers and colleagues over time. It's an exciting collection of business case studies for future reference."

Future of Page Recognition: "*OmniPage* has provided me with the customizable tool that I need. I can use the Partial Page feature to scan only that text which is relevant to my needs. Having a version that runs in MS-Windows should impress those who are committed to that environment. What we're seeing here is the emergence of a new product category."

omniPAGE

Omni-Page (om: all, page: Latin from omni, meaning "all.") 1. Any font, any page to almost any file format, in computerese. 2. The most advanced page recognition software available to MS-DOS and Macintosh users. 3. Allows you to scan any page format, including multiple rows and columns of text and graphics. 4. A modern tool with extensive cultural roots especially applicable for Desktop Publishing (DTP) and designed to eliminate FKS (Fascious Key Strain).

CAERE

For More Information Write: Caere Corporation 100 Cooper Court
Los Gatos, CA 95030 Or Call: 1-800-535-SCAN

OmniPage is a registered trademark of Caere Corporation. MS-DOS and MS-Windows are trademarks of Microsoft Corporation. ©1988 Caere Corporation.

*Regis McKenna's exciting new book, *Who's Afraid of Big Blue*, is available in hardcover and published by Addison-Wesley Publishing. ©Copyright 1988, Caere Corporation. All rights reserved.

CAERE®

MultiTech MT224ES

MultiTech Systems, Inc.
82 Second Ave. SE
New Brighton, MN 55112
612/631-3550

List price: MT224ES \$549, MT224PC
(without MNP protocol) \$499

Accessories: none

Warranty: two years parts and labor

Extended warranty: \$20 per year

Technical support: toll-free number,
M-F 8:30-5

Other support services: 24-hour
BBS

For more information, circle 694 on
reader service card.

Plus Passport

Removable hard disk

PROS: Fast, easy to install

CONS: Cannot boot OS/2, slow insertion/ejection process

Removable hard disks offer infinite headroom, data portability, and excellent security (if the data is locked in a safe, no one can fiddle with it). Until recently, however, removables tended to be slow and difficult to install (see "Removable Resources," *PCW*, December 1987).

Plus Development's removable Passport drive is a breakthrough: It's not cheap (the 20MB unit costs \$1250), but it eliminates most of the installation agony. And at 28ms average access time, it is impressively fast, rivaling even the speedier conventional hard drives.

The Passport system consists of a docking unit that mounts permanently in a vacant half-height drive bay; a half-length, 8-bit controller board; and a 20MB or 40MB cartridge—actually a sealed Winchester drive—that slides into the docking unit. It takes 16 seconds for the drive to settle in and spin up to speed. Pressing a button on the face of the unit locks the heads and ejects the cartridge in 12 seconds. The 20MB and 40MB cartridges can be used interchangeably with the same Passport docking unit.

The Passport boasts some savvy features. Convenient switches on the back of the cartridge allow you to designate it as the boot drive, or make it read-only for extra data security. With your choice of controller cards,

the Passport works equally well in AT-bus and PS/2 machines. To speed performance even further, Plus builds a read/write buffer for disk caching right into the controller.

Installing the Passport system takes about 90 minutes, and while it's a fairly simple procedure, it's not for the faint of heart. You may have to move some boards and cables to slide the docking unit and controller board into place. Still, compared with the older generation of removables, the Passport's a dream: no cable switching, no jumper pulling, no major hassle.

The cartridges are engineered to withstand falls from up to 2 feet. In fact, when a cartridge was accidentally knocked off my desk, it showed no ill effects. A fail-safe hardware system called Airlock physically lifts the heads away from the disk's media whenever power is turned off (or fails).

The Plus Passport offers a winning combination of easy installation and excellent performance. If you've been waiting for someone to work out all the bugs before you "go removable," your wait is over. —*Paul Meyers*

WHERE TO BUY

Plus Passport

Plus Development Corp.
1778 McCarthy Blvd.
Milpitas, CA 95035
408/434-6900

List price: with adopter board and housing, 20MB Passport \$1250, 40MB Passport \$1450; add \$100 for Micro Channel

Accessories: adopter and base \$659, Micro Channel version \$759, base \$349, 20MB disk \$595, 40MB disk \$795, external chassis \$399

Warranty: one year parts and labor

Extended warranty: none

Technical support: toll-free number,
M-F 9-5

Other support: none

For more information, circle 695 on
reader service card.

Paul Meyers is a San Francisco-based video producer and freelance writer specializing in science and technology. TJ Byers is a contributing editor for PC World. ●

OUTSHINE THEM ALL WITH PHOTOMETRIC® SLIDEMAKER®



Make high-resolution slides with your PC or Macintosh®

With PHOTOMETRIC® SLIDEMAKER® you can quickly and easily produce professional-quality slides at your desk with 4K resolution and 100,000 brilliant colors in each slide. Advanced features like automatic text kerning for typeset quality and shaded backgrounds for dramatic effect and emphasis will make your slide presentations more impressive and persuasive than ever. And you can use most popular graphics and presentation software to create your slide images. PHOTOMETRIC SLIDEMAKER is so



easy to use, all you do is select the film you wish to use and the images you want to shoot.

And in minutes your slides will be ready to develop. You can even view your images in high resolution and full color (even on a Mac® SE or Plus) before you shoot them to be sure they are picture perfect.

Find out about the price performance leader in desktop slidemaking. Call today! 800-556-1234 Ext. 234. In California, call 800-441-2345 Ext. 234.

Trademark/Owner: Mac, Macintosh/Apple Computer, Inc.; PhotoMetric, SlideMaker/General Parametrics Corporation.

General Parametrics Corporation Berkeley, CA 415-524-3950

The leader in desktop presentation products

Circle 80 on reader service card

148 **PFS: First Graphics 1.0, Graph-in-the-Box 2.2**

In head-to-head competition, First Graphics offers word charts and elegant font control, but Graph-in-the-Box can pull in data and slap a chart on screen in seconds.

150 **Turbo Pascal 5.0**

Borland goes its exemplary Pascal compiler one better by adding symbolic debugging, better graphics support, and overlays—a Best Buy.

154 **Trading Post**

At last, you can use a PostScript printer with such applications as spreadsheets, data bases, and accounting packages. Another Best Buy.

156 **Prodigy**

Display the day's weather and news events or ask Jane Fonda for some words of wisdom with a lightweight home videotex/E-mail service from IBM and Sears.

160 **Relay Gold 3.0**

This upgraded communications program lets you use expanded memory, run multiple sessions, and create menus, but its file transfers can be slow.



PFS: First Graphics 1.0

Low-end charting program

PROS: Impressive screen output, good control over fonts and attributes

CONS: Limited file exchange and charting options

Graph-in-the-Box 2.2

Low-end charting program

PROS: Excellent data import and export, optional memory-resident mode

CONS: No support for word charts, can't change default font or type sizes

Want to pepper a report with a few charts, but haven't time to master *Freelance Plus* or *Harvard Graphics*? Take heart. The low end of the chart-making scale has a pair of inexpensive packages that can get even a novice graphing within minutes. *PFS: First Graphics 1.0*, a subset of *Harvard Graphics* from Software Publishing Corporation, shines in its editing control over text and chart attributes, and in the quality of its output. But if you want quick and dirty graphs, try the latest version of New England Software's RAM-resident wonder *Graph-in-the-Box*.

Though neither package has any drawing talent, both sport solid charting features. Each program offers variations on six basic graph types and provides reasonable control over colors, line styles, titles, and labels. *PFS: First Graphics'* forte is word charts, making it a natural for desktop presentations. *Graph-in-the-Box's* strong suit is grabbing data from applications as easily as painting a worksheet range.

Graph-in-the-Box has long been known for its snap-and-show approach to chart making. Open the package over any application—1-2-3, say—mark the beginning and end of a data range, and you can put a graph on screen in seconds. The current update of this once toylike program has gained grown-up features, including a much-improved chart selection and 16-color palettes for EGA and VGA displays. (New England's new \$199.95

Graph-in-the-Box Analytic offers even more graph types.) Moreover, *Graph-in-the-Box* exports files in a wealth of formats—including CGM, PostScript, HPGL, and DIF—so you can slug charts into documents produced with such programs as *WordPerfect 5.0*, *Ventura Publisher*, and *PageMaker*. *Graph-in-the-Box* also supports some 100 printers and 30 plotters.

By contrast, about all you can do with *First Graphics* charts is print them; only Software Publishing's *Professional Write* and *Harvard Graphics* can use the program's image files. On the import side, *First Graphics* supports only 1-2-3 worksheet files. Even worksheets from *PFS: Professional Plan*, Software Publishing's own spreadsheet program, must be converted to .WKS or .WK1 format before you can use them in *First Graphics*.

First Graphics' main strength is its healthy selection of attractive charts, including overlapping bar, 3-D bar and pie, scatterplot, word, area, and high/low/close charts. *Graph-in-the-Box*'s selection is a bit more limited, including clustered bar, vertical area, scatter, step, step-and-filled-area, pie, and mixed charts—with no 3-D effects.

Though it's more Spartan, *Graph-in-the-Box* offers lightning speed and the freedom to change your mind. You can quickly toggle through chart types, colors, and other attributes on a layout screen, then press a function key to see the results. The layout screen also lets you edit titles and axis labels and set scaling. You change the underlying data in a separate, worksheetlike screen, where you can also add new values to a chart. But where *First Graphics* gives full control over fonts, *Graph-in-the-Box* limits users to a default font and text size.

Though options are limited in these packages, both make it easy to customize a chart. *First Graphics* automatically fills in variables such as days of the week, dates, and so on. *Graph-in-the-Box* lacks this depth of control, but it offers more line types, fill patterns, and scatter marks. And you can instantly

change a chart's background color, something you can't do in *First Graphics*.

First Graphics gains its most noticeable edge with word charts, which can be bulleted lists or free-form. It comes with five fonts including Roman, Sans Serif, and Gothic, and lets you specify text sizes ranging

FEATURES EVALUATION

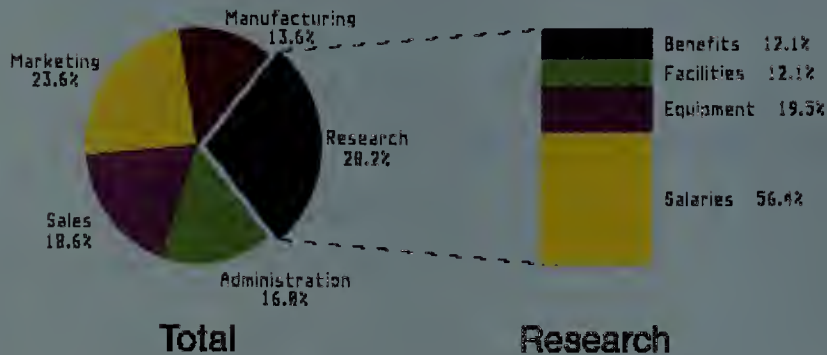
PFS: First Graphics Leads Graph-in-the-Box

Clash at the low end—PFS: First Graphics wins on features, Graph-in-the-Box on speed.

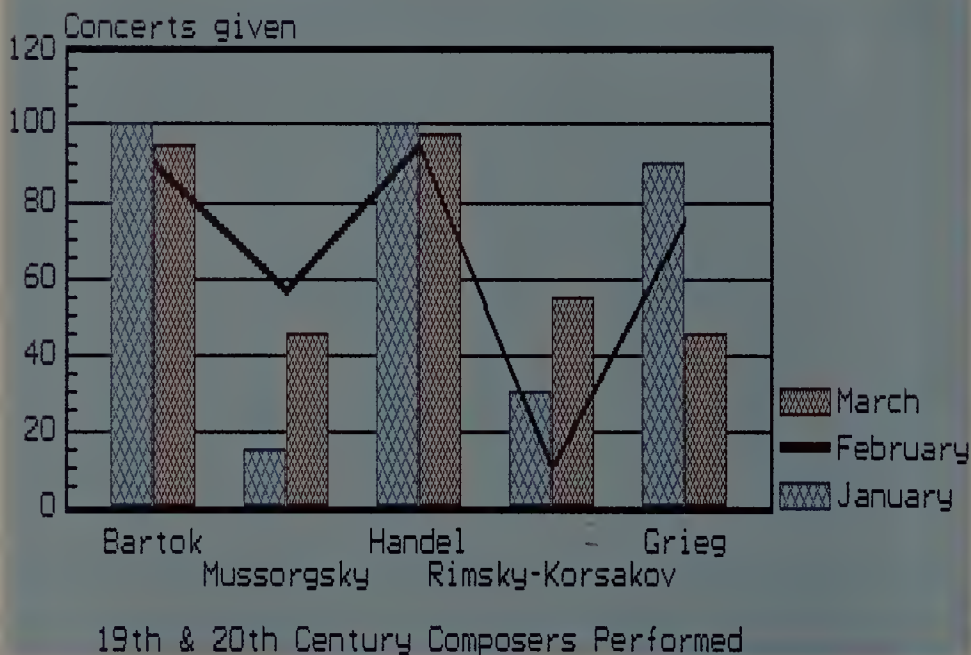
- Yes
○ No

	PFS: First Graphics 1.0	Graph-in-the-Box 2.2
Bar graphs		
Vertical/horizontal bars	●	●
Maximum data sets per clustered bar graph	8	16
3-D bar graphs	●	○
Pictographs	○	○
Bar/line graphs	●	●
Pie charts		
Maximum slices per pie	12	16
Two- or four-pie charts	●	○
3-D pie charts	●	○
Line graphs		
Line graphs and scatterplots	●	●
Maximum data points per line	60	500
Maximum data sets per line graph	8	16
Area graphs	●	●
Other chart types		
Gantt charts	○	○
Ward charts	●	○
High/low/close charts	●	○
Organizational charts	○	○
Data exchange		
Reads ASCII	●	●
Reads .WKS, .WK1	●	●
Reads/writes .PIC	○	●
Reads/writes TIFF	○	●
Reads/writes CGM	○	●
Creates HPGL files	○	●
Ventura- and PageMaker-compatible	○	●

Software Expenses 1988



Musical production figures
USA/Europe 1st qtr. 1989



PFS: First Graphics lets you link two kinds of graphs on screen. Here, a stacked column gives the details from a 2-D pie section.

Memory-resident **Graph-in-the-Box** grabs data and displays it in seconds.

from 1 to 32 points. You can't mix fonts in the same chart, but you can highlight text in different colors.

If you need to generate word charts for desktop presentations, *PFS: First Graphics* should get your nod. Its richer options and steeper learning curve pay off in better-looking charts. But if you're in a rush, grab *Graph-in-the-Box*. Charting doesn't get any easier. —Alan Southerton

WHERE TO BUY

PFS: First Graphics 1.0
Software Publishing Corp.
1901 Landings Dr.
Mountain View, CA 94043
415/962-8910
List price: \$149

Requirements: 320K, two disk drives, DOS 2.0 or later version
Not copy protected
Technical support: unlimited, no toll-free number, M-F 8-4
Other support services: Compu-Serve forum (GO SPCFORUM), quarterly newsletter free to registered users
For more information, circle 620 on reader service card.

WHERE TO BUY

Graph-in-the-Box 2.2

New England Software Inc.
Greenwich Office Park #3
Greenwich, CT 06831
203/625-0062

List price: \$139.95, upgrade from version 1.3 \$35 (\$15 for disk only)

Requirements: 128K, DOS 2.0 or later version

Not copy protected

Technical support: unlimited, no toll-free number, M-F 9-5

Other support services: none
For more information, circle 621 on reader service card.

Turbo Pascal 5.0

Pascal compiler with editor and debugger



PROS: Extremely fast compilation, built-in symbolic debugger, creates overlays, expanded memory support, automatic coprocessor emulation

CONS: More expensive and RAM-hungry than earlier versions, debug window hides program screen

Turbo Pascal originally appealed to beginners who enjoyed easy editing and quick compilation of relatively small programs. Version 4.0 transformed *Turbo Pascal* into a professional programming tool (see *The Software Shelf*, PCW, August 1988). *Turbo Pascal 5.0* continues this metamorphosis, offering built-in symbolic debugging, expanded graphics support, and the return of version 3.0's overlay capability.

As *Turbo Pascal*'s power increases, so do its price and memory requirements—now 448K, up from 384K. In NSTL tests, *Turbo Pascal 5.0*'s lightning-fast compilation speeds were slower than its predecessor's, but the programs it compiles executed faster.

All It Takes To Make The News.

Graphic import and automatic scaling from other GEM® programs such as Artline™ and Presentation Team™

6-720 point type sizes

Text import from popular word processors

WYSIWYG

Automatic text flow around graphics through multi-page documents

C O R P O R A T E Graphics

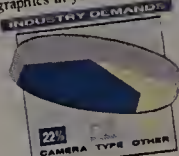
Desktop Publisher

Release 2

Vol. 1 1988

Desktop Publisher Release 2. The Simple Form Of Business.

Today, Desktop Publisher Release 2 offers you the ability of combining text and graphics in your documents.



giving you more control over your designs, deadlines, and costs. With Desktop Publisher, you can create

quality documents quickly and easily, at an affordable price.

Try Your Creativity. Not Your Patience. Desktop Publisher is easy to learn and easy to use. Icons, drop-down menus, and mouse interface eliminate the need for you to memorize complicated commands. Simply point and click to become productive immediately! Since the turn-around time from concept to finished output is totally under your control, you can create quality documents. Production of

newsletters, sales reports, marketing briefs, books, manuals, forms, and other publications is within the time frame that meets your needs. It's like having a small print shop on your desk.

Price/Performance Benchmark.

Desktop Publisher is big on performance, yet small on price. It sets a new price/performance benchmark for the software industry. You get a lot for your money—features from WYSIWYG (what you see is what you get), to

style sheets, help you create high-quality documents. And none of your existing software is obsolete with Desktop Publisher. You can use word processing files and keyboard commands from popular word processors, such as WordPerfect, MultiMate, WordStar, GEM Write, and

(Continued on p. 4)

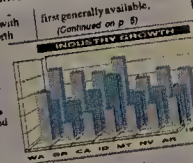
High-quality screen and printer fonts

Color text and graphics

New tracking and kerning features

Automatic hyphenation in 8 international languages

Line art entered directly onto the page



Ask your dealer for Desktop Publisher, to create documents that you can be proud of, easily, quickly, and at an affordable price. For more information, contact Digital Research Inc., Menlo Park, CA.



The news is out! GEM® Desktop Publisher™ Release 2 is the easy-to-learn, easy-to-use solution to all your publishing needs.

With the touch of a key (or mouse), you create professional-quality, image-enhancing newsletters and documents using a DOS-based, high-end workstation or personal computer. Incorporate input from almost any source. Then produce state-of-the-art output from laser, dot-matrix, thermal and ink-jet printers.

It's sophisticated, but it's also fun and easy.

You see exactly what you're going to get—on screen—as you edit, cut, paste and experiment.

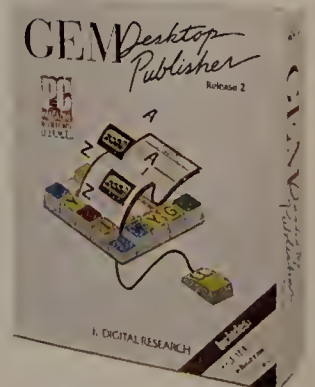
So give your publications something extra, and boost their circulation. GEM Desktop Publisher is all it takes to make any document a newsworthy event.

For more information, contact your nearest dealer or call (800) 443-4200.

All artwork shown was created using Desktop Publisher and Artline.

GEM® Desktop Publisher™

From  DIGITAL RESEARCH®



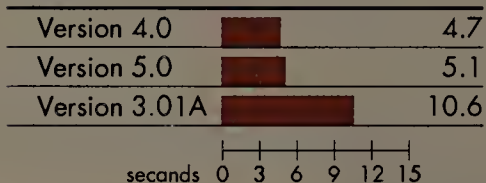
NSTL TEST REPORT

Turbo Pascal 5.0: Better Than Ever

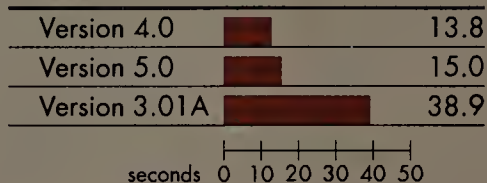
Turbo Pascal 5.0 compiles a tad slower than 4.0, but its programs execute faster.

Compilation

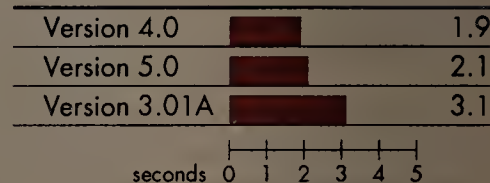
Btree



Chess

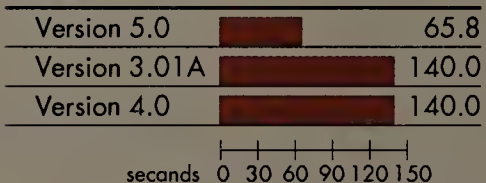


Sort1

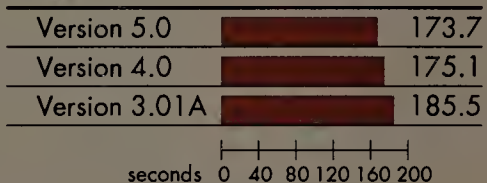


Execution

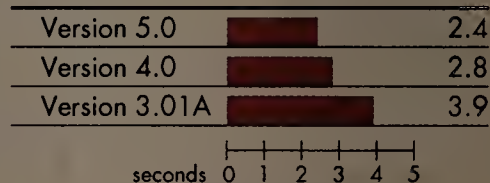
Btree



Chess



Sort1



Benchmarks were performed on an 8-MHz IBM AT Model 339 with a 30MB hard disk and a monochrome video adapter. Three programs, Btree and Sort1 from the Turbo Pascal 3.01 Database toolbox and Chess from the 3.0 Gamewarks toolbox, were used to compare 3.0 to 4.0 and 3.0 to 5.0. Because Turbo Pascal 4.0 and 5.0 use different syntax from 3.0, the Upgrade program provided for 5.0 was used to convert the test programs for use with 5.0.

The Btree benchmark sent all 1000 records of randomly generated data—indexed by customer

code and customer name—to a null printer (a device that simulates an infinitely fast printer, one not slowed by paper or printhead movement). The Sort1 benchmark read from disk the sample customer file provided with the Database toolbox, sorted the data in memory, and then displayed the records on the screen. Almost all the difference in execution speeds is due to the difference in screen updating routines of 3.0 versus 4.0 and 5.0. The Chess benchmark timed how long the program took to respond to a particular move in a specific situation, with the program's "performance level" set to five.

Compilation

The compilation benchmarks compared the time each version took to compile the test programs' ASCII source code files into .EXEs.

Execution

The execution benchmarks compared the execution speeds of 3.0-compiled .EXEs to those of 4.0-compiled .EXEs and 5.0-compiled .EXEs.

Data based on tests designed and conducted by National Software Testing Laboratories (NSTL). All rights reserved.

The biggest addition to version 5.0 is symbolic debugging, which lets you execute a program one line at a time and track down errors quickly. The built-in debugger takes over if you hit <Ctrl>-<Break> while the program is running. The code that was executing appears in the edit window, and you can examine and change any of the variables. If the program is in the middle of a procedure or function, you can find out what procedure called it. You can then restart the program where it left off, or continue stepping through it line by line.

To make the program stop every time execution reaches a certain line—just as if you'd pressed <Ctrl>-<Break> there—you set a *breakpoint* on that line. You can also speci-

fy *watch variables*, whose values are displayed in a window every time execution stops.

Borland has also brought out *Turbo Debugger* for use with Pascal, C, and assembly language. Unlike *Turbo Pascal's* built-in debugger, *Turbo Debugger* can trace *all* .COM and .EXE files at the machine-instruction level and use the 80386 in virtual mode. For \$250, you can get *Turbo Pascal*, *Turbo Debugger*, and the fast *Turbo Assembler*—Borland's first assembly language release—packaged together as *Turbo Pascal Professional*.

Add-on programs aren't the only enhancements to *Turbo Pascal 5.0*. The ability to



How we made the most powerful integrated software a whole lot easier to use.

Yes. There are ways to take something that's very powerful and make it easier to use.

Actually, with Symphony® 2.0, not only is this latest version of the world's most popular integrated program easier to use, but it's also more powerful than ever. So it can keep up with you as your capabilities grow.

For starters, since there's no copy protection, you can get Symphony up and running with much quicker and easier installation.

Once up and running, bingo, you have instant access to five key business functions: spreadsheet, word processing, database, graphics and communications. So you can prepare budgets, write memos, create inventory lists without having to go through the hassle of changing programs.

But Symphony is really more than five separate programs. Because, unlike other integrated packages, Symphony lets you dynamically integrate functions. For example, when you change spreadsheet data, your graph of that data and your memo containing the same numbers automatically reflect the changes. So you get

greater efficiency, and you're able to work faster too.

Plus, the Symphony spreadsheet is the fastest and most powerful spreadsheet available in integrated software, based on Lotus® 1-2-3®, the industry-standard spreadsheet technology.

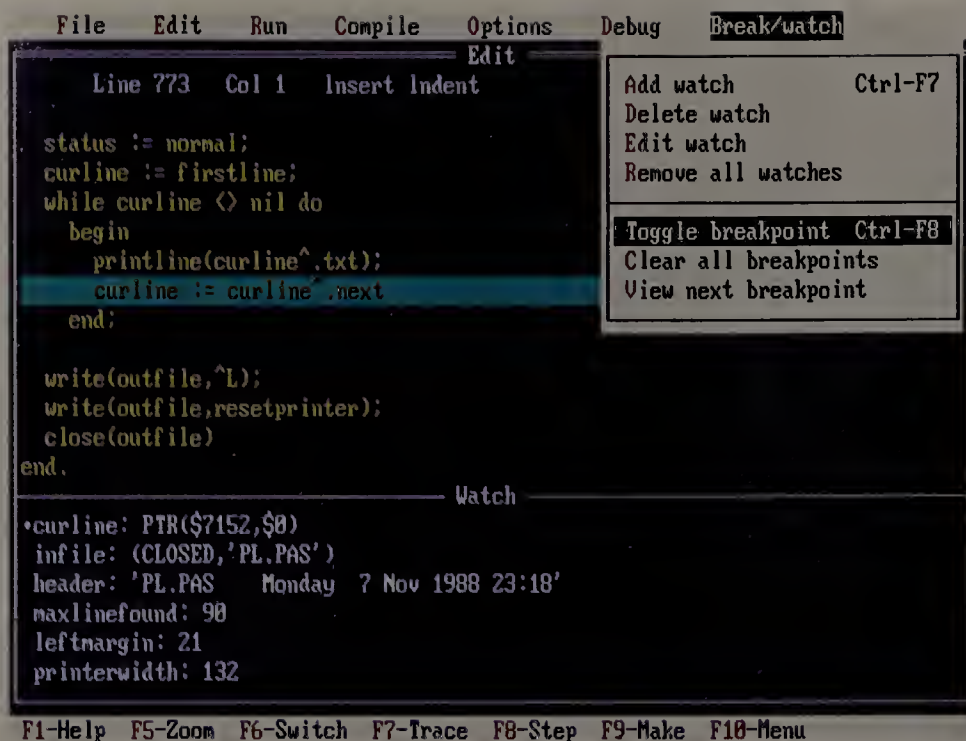
We could go on about the many features of Symphony 2.0—how its macros let you automate complex or repetitive tasks and create customized applications. How the word processor now has a spelling checker and text outliner. And how database and communications have been improved.

The bottom line is that Symphony is one high performance package that's made to be opened up.

Current Symphony users: call 1-800-Trade Up and ask for extension 204 to upgrade to Release 2.0.



Lotus Symphony 2.0



Turbo Pascal 5.0 combines editing, compiling, and debugging. The screen is divided into pop-up windows. Compilation is almost instantaneous.

create overlays—available in version 3.0 but dropped in 4.0—is back, letting you once again write a program larger than available RAM and load it from disk one piece at a time. In version 3.0, you had to declare overlays as “overlay procedures” or “overlay functions,” and they couldn’t be recursive. In version 5.0, you can code them exactly like ordinary procedures or functions (including the ability to use recursion) and use the calling program to place them in an overlay or in memory. *Turbo Pascal 5.0* can store overlays in expanded memory, and the debugger can trace overlaid code.

Version 5.0 also has automatic coprocessor emulation, so a single compiled *Turbo Pascal* program can run on machines with and without coprocessors. The program uses an 8087, 80287, or 80387 math coprocessor if one is present. If it’s missing, the program uses the CPU to emulate it.

The new version expands graphics support somewhat. It supports the IBM 8514/A in its 1024-by-768-pixel mode and gives you two new procedures, `SetRGBPalette` and `SetRGBColor`, to access the VGA’s full range of 262,144 colors.

Turbo Pascal 5.0 does have one really annoying habit. In the editor/compiler environment, as soon as a program finishes running, its output disappears from the screen. You can bring it back by pressing <Alt>-<F5>, but this is an awkward step.

Still, *Turbo Pascal* is unique. It’s a versatile, universal package, and no other Pascal

compiler comes close. Plus, good third-party subroutine packages, such as *Turbo-Plus 5.0* from Nostradamus in Orem, Utah, take the headaches out of windows, menus, and file manipulation. Many of us like Pascal because it’s simpler than BASIC and less cryptic than C. Unless you’re a professional programmer, there’s no reason to look to any other language for greater power or efficiency.

—Michael Covington

WHERE TO BUY

Turbo Pascal 5.0

Borland Int’l
1800 Green Hills Rd.
Scotts Valley, CA 95066-0001
408/438-8696

List price: \$149.95

Requirements: 448K, DOS 2.0 or later version

Not copy protected

Technical support: unlimited, no toll-free number, M-F 8-5

Other support services: Compu-Serve forum (GO BPROGA), BIX forum (JOIN BORLAND), support via MCI Mail

For more information, circle 622 on reader service card.

Trading Post

PostScript printer utility



PROS: Easy to set up and modify, transparent operation, works with network spooling software, speeds serial printing, requires only 5K

CONS: Can’t print text attributes within a document, no graphics conversion

People usually buy a PostScript printer to enhance their word processing or desktop publishing output but are plagued by a constant problem: Applications such as spreadsheets, data bases, and accounting packages don’t support PostScript. Now a handy TSR from LaserTools Corporation called *Trading Post* lets you print on PostScript printers from almost any program and easily determine specific fonts and printing parameters for each application. The \$79 utility’s only drawback is that it limits output from non-PostScript applications to straight text.

Trading Post eats only about 5K of RAM and is transparent in operation. You can

Minidisks

40 tracks side at
48 TPI

Verbatim
— A Kodak Company —
DataLife

DataHold
anti-static liner
Lifetime Warranty

10 Minidisks
2S/2D
MD 2

DataLife

Verbatim
— A Kodak Company —

Minidisks
2S/2D
40 tracks side at
48 TPI

IBM
Formatted

10 Minidisks
2S/2D
Formatted for IBM PC
2S/2D 1000000

Teflon® Protection
on Recording Surface
Lifetime Warranty

For People Who Put A Premium On Performance. And Protection.

The more invaluable your data is to you, the more you'll value Verbatim®. Because when it comes to high performance and data protection, Verbatim has the winning combination no other floppies can copy.

Consider this: Verbatim DataLife® floppies are engineered to perform an average of 50 million revolutions. That's 15 times the industry standard.

Then consider that Verbatim DataLifePlus™ and DataLife HD 5¼" disks were the first floppies to be factory formatted.

Verbatim also gives you plenty to consider when it comes to data protection. After all, nearly 50% of all computer users have lost time and money due to accidental data loss. That's why Verbatim offers advantages like DataHold™ and DataHold II

anti-static liners. So static charges are dispersed before they ever have a chance to build up.

For the world's ultimate data protection, DataLifePlus floppies have an exclusive DuPont Teflon® coating. So fingerprints and spills can be easily wiped from the recording surface.

And of course, all Verbatim floppy disks are tested to be 100% error free and are backed by a lifetime warranty.

Verbatim data cassettes and cartridges, 8", 5¼" and 3½" diskettes. For people who put a premium on performance and protection.

For more information on the full line of high-quality Verbatim products call 1-800-538-8589.

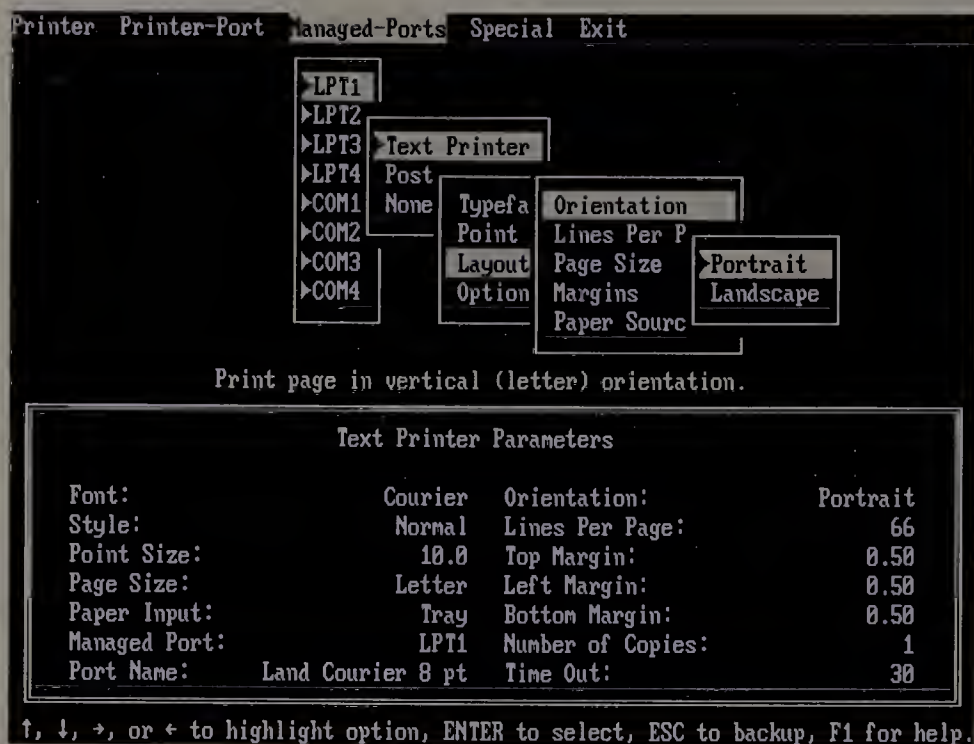
® Teflon is a DuPont registered trademark.



Verbatim
— A Kodak Company —

DOING MORE FOR THE DATA PROCESS™

Circle 315 on reader service card



Trading Post lets you configure your serial printer port to work at high speeds and set up "managed" ports to bring PostScript printing to non-PostScript programs.

create up to eight "managed" (virtual) DOS serial or parallel ports, each with a set of printing parameters. Then you configure each of your applications to use a vanilla text driver (often called ASCII or Standard Printer) to print to one of the ports. *Trading Post* works its magic by intercepting printer output sent to a virtual port and funneling it to the actual port your printer is attached to.

Thanks to a generous series of pulldown menus, installing *Trading Post* is quick work. You configure the managed ports by specifying such parameters as orientation, typeface and size, lines per page, paper bin, and so on. For spreadsheets, you might set up a port (LPT1:, for instance) to print 6-point Helvetica text in landscape mode on legal-size paper. Another managed port might be set up to print your data base reports in 10-point Times Roman in portrait mode on letter-size paper. Finally, you could use a third port to print from programs that speak PostScript.

After configuring the ports, you tell *Trading Post* what port your printer is attached to, and whether it's connected to a print spooler or network. *Trading Post* can even raise the serial port bps rate from 9600 to as much as 57,600 (if you can find a printer that communicates reliably at that speed). LaserTools claims network software that intercepts printer output will work with the program.

Trading Post's biggest failing is that it allows PostScript-clueless programs to print only straight text. Even if your data base package lets you specify boldface or underlining for a text selection, it won't print that way. Everything in the document is in the same font, with no special attributes. Don't expect to print justified text, either; your software thinks it's printing to a dumb printer, not a typesetter.

Trading Post's snazziest feature is the way it lets you set and forget special print parameters for each of your applications. But its biggest benefit is also the most basic one: *Trading Post* finally lets PostScript owners use their high-end printers with common PC programs. —Steve Roth

WHERE TO BUY

Trading Post 1.0

LaserTools Corp.
3205 Buena Vista Way
Berkeley, CA 94708
800/346-1353, 415/843-2234

List price: \$79

Requirements: 5K, DOS 2.0 or later version

Not copy protected

Technical support: unlimited, toll-free outside California, M-F 8:30-5

Other support services: 30-day money-back guarantee

For more information, circle 623 on reader service card.

Prodigy

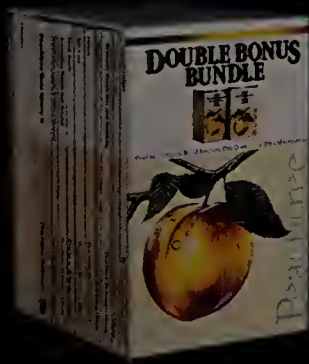
On-line news and E-mail service

PROS: Very inexpensive, easy to use, slick graphics

CONS: Skippy information, poor electronic mail

IBM and Sears have joined forces to create Prodigy, a home videotex and E-mail service that's pretty to look at, slim in content—and very cheap. While the CompuServes of the world lure subscribers with massive downloadable software collections and endless tech chatter, Prodigy zaps users with a *USA Today*-like mix of news nuggets and snappy weather maps. It also offers on-line banking, a travel reservation service, and shopping opportunities galore. Prodigy even flashes three-line ads on your screen for everything

Either Way You Look at It, Peachtree Accounting Saves You Money.



PEACHTREE'S DOUBLE BONUS BUNDLE

Includes Peachtree Complete II
plus
Peachtree Data Query II

**JUST
\$298**
SAVE \$100

With PDQ II Enhanced You Can:

- Create on-screen inquiries to display data
 - Present data in line or bar graphs
- Use any of over 20 pre-defined reports
- Modify pre-defined reports and save the formats
- Create your own reports and save the formats
- Transfer accounting information to spreadsheet and database programs like dBASE III® and Lotus 1-2-3®

And More!

A Recent Survey by the
American Institute of
CPAs Reports More
Accountants Use and
Recommend Peachtree
Than Any Other
Accounting System!

When it comes to accounting software, no one offers you more for your money than Peachtree. Now we're offering you two ways to buy our best-selling accounting software — and two great ways to save.

Peachtree Complete™ II is our premier business accounting system. Designed and sold as a \$5,000 accounting system, the latest version of Complete II represents a vastly expanded and greatly improved package that sells for an unbelievably low \$199. Find out what over 250,000 satisfied users already know — no other accounting system offers so much for so little.

And now, for businesses who want to make the most of their accounting information, Peachtree's Double Bonus Bundle gives you Peachtree Complete II Accounting plus its own custom reporting tool, Peachtree Data Query II™ Enhanced. The Double Bonus Bundle includes both systems — regularly priced at \$199 each — for just \$298. That's

a savings of \$100! Either way, Peachtree offers you the most accounting you can get for your software dollar.

Peachtree Complete II is a comprehensive accounting system developed to meet the needs of small- to medium-size businesses. It comes with eight high-power modules that may be used individually, or fully integrated for maximum accounting efficiency:

- | | | | |
|-----------------------|--------------------|-------------|----------------|
| • General Ledger | • Accounts Payable | • Inventory | • Fixed Assets |
| • Accounts Receivable | • Invoicing | • Job Cost | • Payroll |

And Peachtree Complete II is designed using the latest software innovations, like full-color scrolling reference tables, pop-up windows, and short-cut keyed menus. We've expanded to allow an unlimited number of companies, added service invoicing, range printing, and more.

Peachtree Complete II's error handling is quick and easy, with plain English messages and suggestions. Context-sensitive Smart HELP is on-line, all the time. And as always, Complete II comes with the most thorough documentation — a separate quick-start Installation Guide, Accounting Primer, seven-volume Reference Library, and extensive on-line tutorials on each module — all at no extra charge.

Now you can extend the power of your Peachtree accounting to include custom reporting and analysis, and save even more money! Order the Double Bonus Bundle and you'll get Peachtree Complete II, plus Peachtree Data Query II Enhanced, for just \$298.

PDQ lets you turn raw figures into highly sophisticated reports, allowing you safe, easy access to valuable information from all eight Peachtree Complete II modules. PDQ's simple, clear approach gives you maximum control and flexibility. You tell PDQ what information you need, and PDQ looks through your accounting files, finds it, and presents it to you any way you want it — on screen or printed, as a graph, in report form, or ready for export to another software package.

You can begin creating reports in just minutes, thanks to all new user instructions and on-line practice sessions that lead you through the system and build confidence as you go. With Peachtree's Double Bonus Bundle, accounting and custom reporting go hand-in-hand, and that makes good business sense.

MONEY BACK GUARANTEE. We stand behind Peachtree Complete II and PDQ II with a toll-free hotline for technical support (\$1 per minute, \$20 minimum on your credit card) and a 30-day money-back guarantee when you buy directly from Peachtree. If for any reason you're not satisfied, you can return your package within 30 days for a prompt refund. That's the Peachtree Software promise. A \$25 restocking fee applies to all returns.

Peachtree Complete II: the Business Accounting System for just \$199, and Peachtree's Double Bonus Bundle for just \$298. Either way you look at it, Peachtree Software saves you money. Order today!

HARDWARE SPECIFICATIONS: Requires PC/MS-DOS version 2.0 or higher with 384K of usable memory (512K required with DOS 3.3) and a minimum 10 MB hard disk. For use with the IBM® PC, PC XT, PX AT, Personal System/2™ and compatibles. 3 1/4" media optionally available. Not copy protected.
Lotus 1-2-3 is a registered trademark of Lotus Development Corporation. dBASE is a registered trademark of Ashton-Tate Corporation. IBM is a registered trademark and Personal System/2 is a trademark of International Business Machines.



PEACHTREE COMPLETE II

**STILL ONLY
\$199**

General Ledger

- Chart of Accounts includes 76 suggested and 26,000 user-defined accounts.
- Comparative financial statements.

Accounts Receivable & Invoicing

- Maintains open item or balance forward customers.
- Up to 14,400 customers.
- Prints product or service invoices.

Accounts Payable

- Partial payments of invoices.
- Up to 14,000 vendors.
- Checks printed with unlimited invoice listing on stub.

Inventory

- Supports average and standard costing methods.
- Up to 19,500 inventory items.

Fixed Assets

- Handles 13,000 assets and 13 methods of depreciation.

Job Cost

- Tracks costs and profitability on a job-by-job basis.

Payroll

- Built-in current year tax tables.
- Prints checks, W-2s and more.
- Processes up to 3,900 employees.

And More!

**Call Now to Order
1-800-247-3224**
(or call 1-404-564-5800)



To Order by Mail Add \$12.50 Shipping and Handling*.
(In Georgia add applicable sales tax.)

Peachtree Software

4355 Shackelford Road, Dept. PCW, Norcross, Georgia 30093

* Telephone number required on all orders.

Circle 144 on reader service card

from kayaks to pantyhose. It's light fare, but you can't beat the price: \$9.95 a month buys unlimited on-line time for up to six people in one household.

To access Prodigy, you need a \$49.95 start-up kit that includes instructions and the service's custom telecommunications software. An extra \$100 gets you a special pocket-size Hayes 1200-bps modem that plugs directly into a wall outlet.

For a service designed for home computer-niks, however, Prodigy demands the hardware of a business PC. It requires a graphics adapter, yet only displays color screens with a EGA card. It doesn't support the VGA and won't run with an IBM EGA card hooked to a monochrome monitor. Worse, it's grievously slow when running on anything less than an AT.

Prodigy's custom software generates video pyrotechnics on cue from the on-line system, so Prodigy doesn't have to transmit its art deco over pokey phone lines. But the program chews up 512K of RAM and won't run with any memory-resident programs. And novices will find downloading information tricky: You instruct the Prodigy software to print it out, then redirect the output to a disk file using DOS commands.

To log on to Prodigy, you just type a user ID and password. Once connected, you're greeted by a screen ablaze with the day's headlines and a blinking icon if you have

E-mail waiting. Navigation is strictly point and shoot. To skip from one corner of the service to another, you summon pop-up menus, or create a path that zips you to predetermined locales on the system whenever you log on.

Information-wise, Prodigy is as light as cotton candy. News stories appear in a flash of crayon-thick letters, and though the likes of Jane Fonda and Howard Cosell will answer questions on line, their offerings are seldom more than a couple of aphoristic lines. Prodigy offers free stock quotes with a 15-minute delay. At press time, the only forums Prodigy offered were the PC Club and the Food and Wine Club, though more were promised.

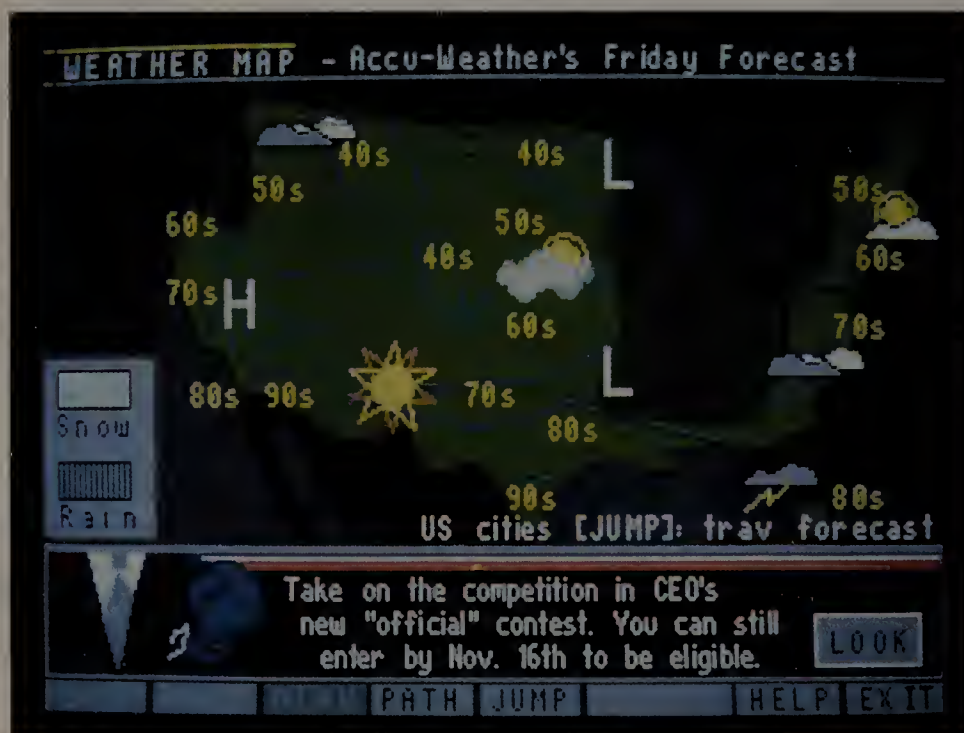
Finally, Prodigy's private electronic mail facility is Lilliputian. Messages are limited to about 250 words, and you can't edit or carbon copy them, or get word that yours have been received.

Prodigy is aware of its shortcomings, and plans to improve its news coverage and expand its reach. At press time, Prodigy was available only in Atlanta, Connecticut, and parts of California. A dial-up node in the Baltimore-Washington area was planned for spring, with others in New York and Detroit to follow.

Dialing into Prodigy may not be the same as visiting the library at Alexandria, but then it isn't meant to be. For free stock quotes and all the E-mail you want, \$9.95 a month looks like a bargain. If you want video news, though, spend the money on cable TV.

—Judy Getts

A blaze of icons and graphics make Prodigy a feast for the eyes. Many users will start the day with a snappy weather map.



WHERE TO BUY

Prodigy

Prodigy Services
445 Hamilton Ave.
White Plains, NY 10601
800/822-6922

Requirements: 512K, two disk drives, DOS 2.0 or later version, graphics adapter, 1200-bps modem

Operating hours: 7 a.m.—1 a.m. EST, 6 a.m.—midnight PST

List price: start-up kit including software, instructions, and three months of use \$49.95; start-up kit with 1200-bps modem \$149.95; basic monthly fee \$9.95, extra charge for on-line banking and other services

Technical support: unlimited, toll-

Read It And Reap.

TO: Any one interested in writing improvement
FROM: Ken Dickens, ad writer

RE: Writing improvement with NEW Grammatik III, a demo disk, and a contest to get both ABSOLUTELY FREE

"Software to easily help me write more better (not just easier or faster, but "better")?" "Right, Don." That's what I said last year when the president of Reference Software bet a gourmet lunch that Grammatik II could help even me. I lost. He ate quail eggs. I ate crow.

Now there is Grammatik III. Don says "it's a super whiz-bang high-tech expert system artificial intelligence writing improvement program that makes Grammatik II (and all other grammar checkers) look like Dick and Jane readers. He wants to bet lunch again.

What should I do?

He says Grammatik III actually "proofreads" your writing (how can it do that?) for errors in grammar, style, usage, and spelling.. It can recognize nouns, verbs, adverbs, articles, adjectives, or pronouns so it catches a number of problems no other grammar or spelling checker can. It's simple too use. Give Grammatik III your document's name. Watch it work, right on the screen (it can't be that easy, can it?). He says it identifies writing problems, offers suggestions for improvement, and get this, lets you ignore the suggestion and continue, or make changes in your word document immediately. Without ever going back to to your word processor.

Then he gave me this example, (which I don't believe even for a minute): Grammatik III might stop on a sentence like "Its a long way to Tipperary", tell you that the word following "its" is usually incorrect after an possessive pronoun, and suggests "It's" instead.

I laughed. I knew it was impossible. Don smiled and very calmly explained that although Grammatik III is not perfect, it finds errors like incomplete sentences, improper use of homonyms (like "their" instead of "there"), split infinitives, subject/verb and noun/modifier disagreements, passive voice, and etc. It even catches unbalanced punctuation, doubled words, transpositions (like form/from). . . . He went on for fifteen minutes.

Software can't do that. Can it? But if it did. . . better writing brings big bucks (and I do have three kids to support). Should I take the bet? I'm confused. Help! Before I try it, tell me if Grammatik III helps your writing. Enter this contest (the details are below), try Grammatik III free, and let's discuss it over dinner. In San Francisco.

Ken Dickens

POSSESSIVE
ERROR, ONLY 18
TO GO, GOOD LUCK

FREE
DEMO!



The Contest Everyone Wins.

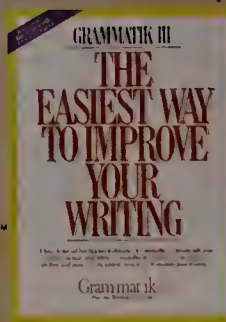
New Grammatik III found nineteen practical ways to improve this memo in just over one minute. If you can circle the same problems and explain what the problems are, we'll send you Grammatik III absolutely free. Go ahead, try it. Because even if you miss them all you'll receive a FREE Grammatik III demo disk just for entering. And, you'll automatically be entered in our "Dinner in San Francisco" drawing.†

The contest is great, but here's an even

faster, easier way to get better writing. Order Grammatik III right now for only \$99 with our "30-Day Write Better or Your Money-Back Guarantee." New Grammatik III. It's the risk-free way to reap the rewards of better writing.

Order Today:
(800) 872-9933

Gram·mat·ik III™
Powerful Writing Improvement



☐ Here's my contest entry. Please send me a FREE Grammatik III demo disk (\$4.95 value).
☐ Please send me _____ copies of Grammatik III for \$99ea. plus \$7.50 shipping (\$10 per unit outside USA) CA residents add applicable sales tax.

I enclose \$ _____ ☐ VISA ☐ MC ☐ AMEX

Card # _____ Exp. _____

Name _____

Company _____

Address _____

City/State/Zip _____

Phone (____) _____

330 Townsend St. Suite 123, San Francisco, CA 94107

30-Day Money-Back Guarantee

Reference
Software™

*RightWriter owners call for special \$29 trade-up offer or get a FREE copy of Grammatik III if RightWriter finds all the mistakes in the above letter. Grammatik II owners call for low-cost upgrade. †Limit one (1) free Grammatik III package and Grammatik III demo disk per person/address. San Francisco trip is for two (2) and includes round trip airfare from anywhere in the continental U.S., one night's hotel accommodations, and dinner with Don Emery and Ken Dickens. Travel arrangements will be made by Reference Software. Contest ends March 15, 1989. Drawing to be held from all entries postmarked before March 15, 1989. Contest entries using Grammatik III will be disqualified. Grammatik is a trademark of Wang Laboratories. Reference Software is a trademark of Reference Software, Inc. © 1988

Circle 282 on reader service card

All New Version
(RightWriter Owners
Upgrade Now!*)

free number, available only during Prodigy's operating hours
For more information, circle 624 on reader service card.

Relay Gold 3.0

Communications program

PROS: Offers IBM 3270 software terminal emulation; powerful, easy-to-use scripting language

CONS: Slow file transfers, clunky editor with forgettable commands

When *Relay Gold 2.0* came out in 1987, MIS managers got a smooth telecommunications software link between PCs and IBM VM/MVS mainframes. Used in conjunction with another Relay Communications product, *Relay 3270*, it supported 3270 emulation with software, thereby eliminating the IRMA card hardware overhead. With *Relay* running on both ends, users could dial up the company mainframe from anywhere without an IRMA card.

Now Relay Communications has amalgamated *Relay Gold 2.0* and its general-purpose communications package, *Relay Silver*, into *Relay Gold 3.0*. The program's new features include expanded memory support, multiple sessions, new terminal emulations, and enhancements to *Relay Gold 2.0*'s script language. *Relay Gold 3.0* has features on a par with those of *Crosstalk Mk. 4* and *Smartcom III*, but at only 192K of RAM re-

quires far less memory. Alas, despite the addition of a new file compression algorithm, *Relay Gold 3.0*'s file transfer times were quite uneven in NSTL tests, often lagging behind *Relay Silver*'s.

Relay Gold 3.0 shares with version 2.0 a background communications mode that won't crash your system, a flexible scripting language, and an interface that can be used by just about anyone. New in *Relay Gold*'s dialing directory are IBM 3101 terminals, DEC VT/220/240 terminals, and an option for running an IRMA card connected to the mainframe with coaxial cable.

In version 3.0, *Relay Gold*'s scripting language gains some debugging commands and the ability to create pop-up menus for monitoring the progress of file transfers. New commands and functions allow a user to download data invisibly and import it directly into 1-2-3, for example, without ever leaving the spreadsheet. *Relay Gold 3.0*'s English-like scripting language is easier to use than *Crosstalk*'s CASL and offers better error trapping. And its new menuing capability surpasses those of *Crosstalk Mk. 4* and *Smartcom III*.

Relay Gold 3.0's proprietary file transfer algorithm supposedly saves time by compressing files during transmission, instead of before. But *Relay Gold 3.0*'s proprietary protocol performed well only in NSTL file transfers involving errors and delays, which suggests it would work acceptably on noisy phone lines.

With *Relay 3270* on the company mainframe you can dial up the mainframe through regular phone lines, a handy feature if your staff includes a field sales force equipped with laptops that don't accommodate 3270 emulation cards.

If you need a telecommunications package to connect PCs with an IBM mainframe, *Relay Gold 3.0* would be a good buy. But its slow file transfers make it hard to recommend to anyone who's in a hurry. —Ken Smith

WHERE TO BUY

Relay Gold 3.0

Relay Communications
41 Kenosio Ave.
Donbury, CT 06810-9990
203/798-3900

In *Relay Gold 3.0*, you initiate dialing from an off-line "Directory of Computers." Just place the cursor under the name of the service you want, and press the <F1> key.

Directory of Computers			
Name	Telephone Number	Speed Type	Notes and Comments
IBM 3101	203-798-3900	300 BPS	IBM 3101
IBM 3270	203-798-3900	300 BPS	IBM 3270
DEC VT/220	203-798-3900	300 BPS	DEC VT/220
DEC VT/240	203-798-3900	300 BPS	DEC VT/240
IBM 3101	203-798-3900	300 BPS	IBM 3101
IBM 3270	203-798-3900	300 BPS	IBM 3270
DEC VT/220	203-798-3900	300 BPS	DEC VT/220
DEC VT/240	203-798-3900	300 BPS	DEC VT/240
IBM 3101	203-798-3900	300 BPS	IBM 3101
IBM 3270	203-798-3900	300 BPS	IBM 3270
DEC VT/220	203-798-3900	300 BPS	DEC VT/220
DEC VT/240	203-798-3900	300 BPS	DEC VT/240

Use PgDn and PgUp to scroll the Directory. Press ENTER when finished.

F1 = Call Name at Cursor F2 = Answer Name at Cursor

F3 = Add a New Name in Directory By Copying Entry at Cursor F4 = Review Connect Options for Name at Cursor

Esc = Quit F10 = HELP

RELAY Gold 3.0 70 10 11 2000 1000 0000 0000

Discover PC-Link®



Unlimited online usage for just \$9.95 a month

Finally, an online service for MS-DOS® computer owners has arrived offering a wide variety of exciting and informative services for just \$9.95* a month—*no matter how many hours you spend online.*

Introducing PC-Link. With PC-Link's friendly, menu-driven DeskMate® interface, you'll discover the services you want—at a great low price that won't have you watching the clock. Services like a Software Buyer's Guide, stock quotes hot off the wires, American Airlines EAASY SABRESM travel services, Grolier's Academic American EncyclopediaTM and news from USA Today®.

Plus, there's more.

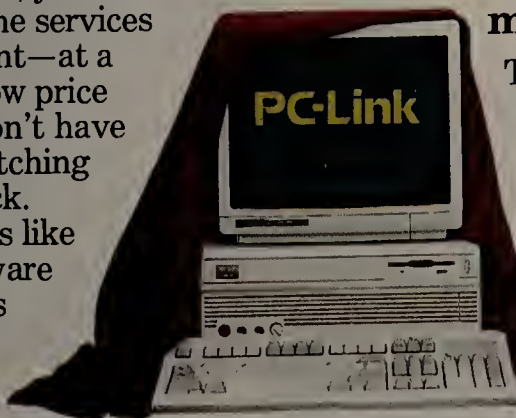
As a PC-Link member, you'll also have access to the premium services of PC-Link

Plus at the low rate of 10 cents* a minute. No extra charges for 1200 or 2400 baud users! PC-Link Plus features services designed exclusively for PC owners, including an impressive selection of software for downloading, help from PC experts, clubs, special interest groups, and more.

Your first month is FREE!

This special offer entitles you to 1 free month of unlimited access to PC-Link, plus 2 free hours** of PC-Link Plus services—everything you

need to get you started with your purchase of the PC-Link Software Package for just \$29.95***. That's a \$21.95 value, yours FREE when you become a PC-Link member. What's more, you'll receive a subscription to *PC-Link Update*, your guide to all the exciting events and services online.



Don't delay! Order your PC-Link Software Package today for just \$29.95.

Or visit leading computer and software dealers near you.

Call 1-800-545-6572 Ext.3185

☐ **Yes!** I want to become a PC-Link member! I understand that my Introductory PC-Link Software Package includes 1 FREE month of unlimited access to PC-Link, plus 2 FREE hours of evening or weekend use of PC-Link Plus services, and a subscription to *PC-Link Update* magazine, all for only \$29.95.

Full Name _____

Street Address _____

City/State/Zip _____

Daytime Phone Number _____

Evening Phone Number _____

Disk Size ☐ 5¼ ☐ 3½

Enclosed is my \$29.95 payment. I'm paying by

☐ MasterCard ☐ Visa ☐ Check

Credit Card # _____

Exp. Date _____

Signature of Cardholder _____

Mail to: PC-Link
8619 Westwood Center Drive
Suite 200
3185 Vienna, VA 22180

PC-Link®
The online service for PC owners.



*Rates higher during business hours and outside continental United States.
Evening and weekend usage rate of 10 cents per minute applies. *Requires PC-compatible computer with at least 384K RAM, MS-DOS version 2.11 or higher, a Hayes-compatible modem, and a MasterCard, Visa, or checking account for registration. PC-Link is a registered trademark of Quantum Computer Services, Inc. Grolier's Academic American Encyclopedia is a trademark of Grolier's Electronic Publishing, Inc. USA Today is a registered trademark of Gannett Company, Inc. EAASY SABRE is a service mark of SABRE Travel Information Network. MS-DOS is a registered trademark of Microsoft Corporation.

©1989 Quantum Computer Services, Inc.

Circle 295 on reader service card

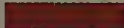
NSTL TEST REPORT

Relay Gold 3.0: Pokey File Transfers

Relay Gold 3.0 turns in a patchy performance next to Crosstalk Mk.4 and the program it replaces, Relay Silver.

Protocol

Proprietary

Relay Silver		10.1
Crosstalk Mk.4		17.8
Relay Gold 3.0		18.1

Kermit

Relay Silver		18.2
Relay Gold 3.0		18.4
Crosstalk Mk.4		24.4

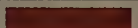
Checksum XMODEM

Crosstalk Mk.4		16.1
Relay Silver		16.4
Relay Gold 3.0		16.7

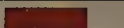
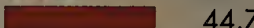
seconds 0 5 10 15 20 25

Protocol/error

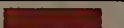
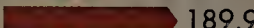
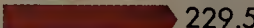
Proprietary

Relay Gold 3.0		37.5
Crosstalk Mk.4		39.8
Relay Silver		44.6

Kermit

Relay Gold 3.0		24.4
Crosstalk Mk.4		44.7
Relay Silver ¹		

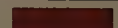
Checksum XMODEM

Crosstalk Mk.4		26.1
Relay Silver		189.9
Relay Gold 3.0		229.5

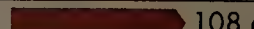
seconds 0 10 20 30 40 50

Protocol/delay

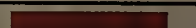
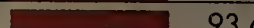
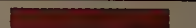
Proprietary

Relay Silver		13.5
Relay Gold 3.0		19.9
Crosstalk Mk.4		59.3

Kermit

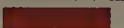
Crosstalk Mk.4		30.9
Relay Gold 3.0		107.5
Relay Silver		108.6

Checksum XMODEM

Relay Gold 3.0		92.6
Crosstalk Mk.4		93.6
Relay Silver		93.7

seconds 0 20 40 60 80 100

No protocol

Crosstalk Mk.4		31.9
Relay Silver		38.4
Relay Gold 3.0		48.5

seconds 0 10 20 30 40 50

¹ Could not perform this test.

All tests were performed on a pair of IBM PC XT's connected by null modem cables to an IBM AT running Cambench, a transmission emulation program. Tests consisted of the transmission of a 10K file at 9600 bps. Prior to testing, each hard disk was formatted and DOS 3.2 was installed in its own direc-

tory. A CONFIG.SYS file was then created in the root directory, specifying FILES=20 and BUFFERS=25. Finally, the communications program was installed in its own directory according to the manufacturer's instructions. The identical program and version number were used on each computer, but to maintain the integrity of our tests, the program serial numbers were different. In tests using protocols, each program was run with Kermit and Checksum XMODEM. Although these protocols are not universal standards, most communications programs support them. The proprietary protocol included with each was also tested.

Protocol

The program transmitted a 10K text file at 9600 bps with Checksum XMODEM and Kermit.

No protocol

The program was set to display each character as it was echoed from the host (remote echo).

Protocol/error

A 10K text file was transmitted, and errors were inserted in the transfer at the rate of 1 character dropout and 1 changed byte per 1500 characters.

Protocol/delay

For this test, characters were delayed approximately .5 second between computers.

Data based on tests designed and conducted by National Software Testing Laboratories (NSTL). All rights reserved.

List price: \$295, upgrade from Relay Gold 1.0 and 2.0 \$75 (free if version 2.0 was purchased after May 16, 1988), upgrade from Relay Silver \$95; five-user network version \$825, additional nodes \$115; server upgrade \$75, each node \$25, manual \$20

Requirements: 192K, DOS 2.0 or later version

Technical support: unlimited, no toll-free number, M-F 8-5

Other support services: BBS, quarterly newsletter free to registered users

For more information, circle 625 on reader service card.

Alan Southerton wrote Programmer's Guide to the OS/2 Presentation Manager (Addison-Wesley, Redding, Massachusetts, 1989).

Michael Covington is a researcher with the Advanced Computational Methods Center at the University of Georgia in Athens. Steve Roth is the editor of Real World PostScript (Addison-Wesley, Redding, Massachusetts, 1988). Judy Getts is a contributing editor for PC World. Ken Smith is a PC engineer at Hewlett-Packard in Mountain View, California. ●

Introducing Lucid 3-D. Version 2.0!

A Remarkable New
Spreadsheet
at a Familiar
DacEasy™
Price!

\$99.95
(Suggested Retail Price)

HomeOffice
COMPUTING
★ EDITORS' PICK ★



Version 2.0 of Lucid 3-D is more than a bag of new features. It's a masterwork! The original Lucid 3-D captured the industry's attention with its simple to use, yet remarkable three dimensional capabilities. Last year's winner of *PC Magazine's* Award for Technical Excellence, Lucid 3-D is fast, even on a 256K, 8088 computer. Lucid 3-D is the super spreadsheet that doesn't require a super computer!

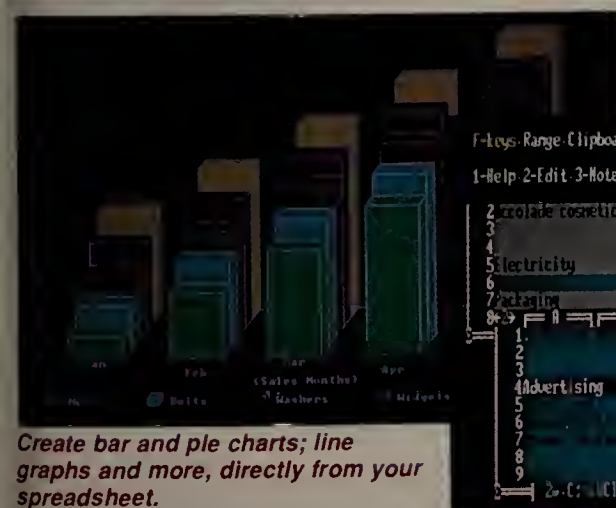
DacEasy is proud to produce this leading edge product. Its innovative design allows first time users to learn quickly while power users of other spreadsheets move to our advance features effortlessly. The Lucid 1.0 featured pull-down menus, optional instant command keys, multiple windows, a notepad in every cell, optional ram, total

"Lucid is a spreadsheet for our times. It is technical tour de force in an era that seems to have forgotten how to write tight code." PC MAGAZINE

"You might think that a RAM resident spreadsheet would necessarily be limited in features. We found that Lucid 3-D is anything but limited in power." INFOWORLD

"Lucid 3-D is a package that could alter the face of future spreadsheets. It offers residence, multiple windows, colour, mouse support and rapid execution." PC USER

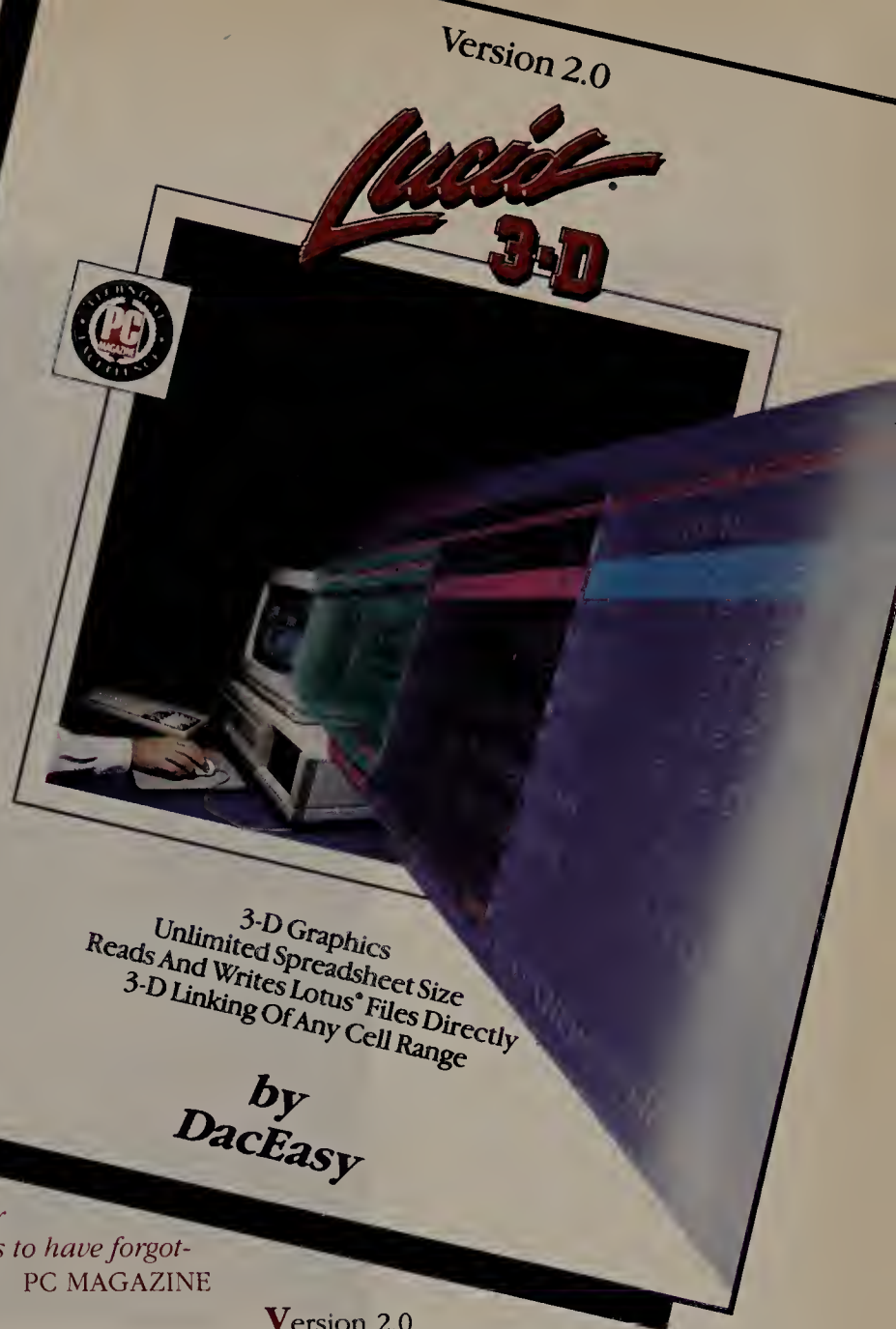
Version 2.0 is Even More Amazing!



F-keys: Range Clipboard Storage Print Three-D Windows Audit Options Exit		
1-Help 2-Edit 3-Note 4-Find 5-Goto 6-Jump 7-Macros 8-Range 9-Calc 10-Menu		
2	April	3
3	April	4
4	5	5
5	Electricity	6
6	8,002.00	7
7	136,182.45	8
8	57,000.00	9
9	1	10
10	2	11
11	3	12
12	4	13
13	5	14
14	6	15
15	7	16
16	8	17
17	9	18
18	10	19
19	11	20
20	12	21
21	13	22
22	14	23
23	15	24
24	16	25
25	17	26
26	18	27
27	19	28
28	20	29
29	21	30
30	22	31
31	23	32
32	24	33
33	25	34
34	26	35
35	27	36
36	28	37
37	29	38
38	30	39
39	31	40
40	32	41
41	33	42
42	34	43
43	35	44
44	36	45
45	37	46
46	38	47
47	39	48
48	40	49
49	41	50
50	42	51
51	43	52
52	44	53
53	45	54
54	46	55
55	47	56
56	48	57
57	49	58
58	50	59
59	51	60
60	52	61
61	53	62
62	54	63
63	55	64
64	56	65
65	57	66
66	58	67
67	59	68
68	60	69
69	61	70
70	62	71
71	63	72
72	64	73
73	65	74
74	66	75
75	67	76
76	68	77
77	69	78
78	70	79
79	71	80
80	72	81
81	73	82
82	74	83
83	75	84
84	76	85
85	77	86
86	78	87
87	79	88
88	80	89
89	81	90
90	82	91
91	83	92
92	84	93
93	85	94
94	86	95
95	87	96
96	88	97
97	89	98
98	90	99
99	91	100

You can open unlimited windows (up to nine on a screen) in different directories, drives, & 3-D levels.

which would have taken over an hour now takes less than a minute! Version 2.0 can now accept files as big as RAM (up to 8 megabytes) with models as large as allowable disk space. Lucid 2.0 can now read and write 1-2-3 and dBase files directly.



Version 2.0 makes doing "what ifs" a pleasure! Now build your 3-D spreadsheet (the wave of the future) by linking any range of cells to another spreadsheet. What's more, do graphics instantly (includes 3-D bar charts) by just selecting a range. Customize colors for any cells, and use the enhanced text inserting library feature. Further, you can now instantly have up to nine windows of your 3-D levels showing on the screen at once. And that's not all, 38 other new features make spreadsheeting really exciting!

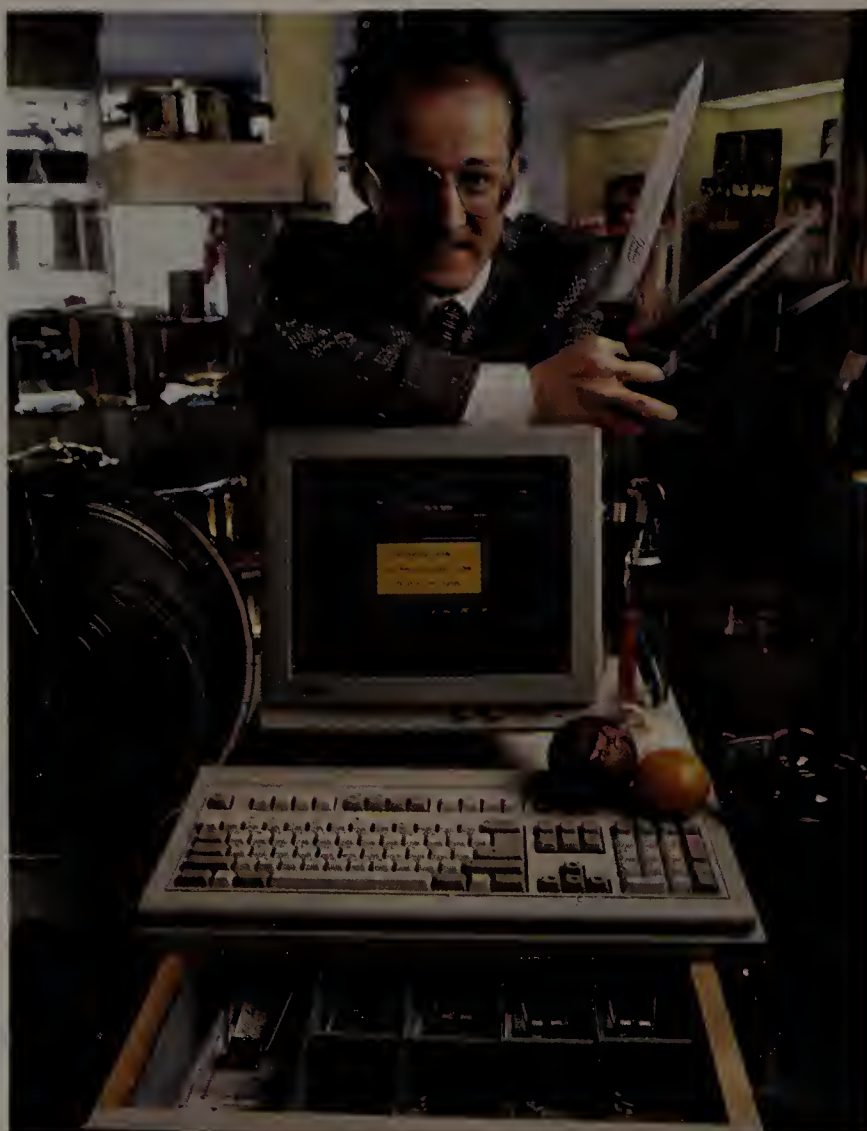
Buy Lucid 3-D for only \$99.95 at all leading retailers. Upgrades to Version 2.0 are only \$35.00. For more information call us at our toll-free number!

**Call Toll Free
1-800-877-8088**

DacEasy™

17950 Preston Rd. Suite 800 • Dallas, TX • 75252

30 Day Money Back Guarantee: Dac offers an unconditional guarantee on all products bought directly from Dac Software, (less shipping charges).
Minimum Hardware Requirements: IBM or 100% compatibles, 256K memory (384K with Graphics), two disk drives. Mouse optional. **Trademarks:** IBM, MS-DOS, PC-DOS, Lotus 1-2-3, and dBase. Lucid 3-D and DacEasy are trademarks of Dac Software, Inc. 17950 Preston Rd., Suite 800, Dallas, TX 75252
Lucid 3-D is another fine product developed by the innovative people at PCSG.



Checking Out Point-of-Sale Systems

R o n n i e G u n n e r s o n

Affordable point-of-sale (POS) PC systems are revolutionizing Main Street America. From hardware stores to yogurt shops, retailers are tracking their inventory as they ring up sales, and the dramatically improved flow of information has helped some businesses multiply in size. As in any revolution, some foot soldiers have become casualties, but believers still outnumber cynics.

For well under \$1000, off-the-shelf software running on PCs plugged into cash drawers and receipt printers automatically captures and records transactions as they happen. Once this seemingly prosaic information is stored, retailers can pull reports detailing everything from the number of pickles sold daily to the bushels of potatoes Customer X bought this year. That means mom-and-pop retailers can manage inventory as deftly as J.C. Penney and Sears.

Well, almost. Many retailers are finding it difficult or impossible to link their new systems to their accounting operations. Getting POS numbers into their general ledgers sometimes requires rekeying the data. Additionally, a few retailers have been shell shocked by glitches in their packages. Inexpensive POS systems are still proving themselves, so finding the right system and the right supplier is critical.

First, the Good News

Sam Feizi of Balboa Office Supply in San Diego is among the satisfied converts. In 1986, with a 32,000-item inventory to manage, Feizi was looking for a POS system that was as fast and easy to use as possible. Chuck Atkinson Programs delivered, Feizi says. "There are no complications, and the program menu is standardized across all modules." He paid \$699 for Atkinson's *Quick Register* POS program and \$195 for the *Quick Check* accounting program. He runs them on a Novell network composed of an Epson Equity III Plus file server and four XT workstations.

Feizi says the system has increased his company's productivity at least fourfold—"probably more." Before POS, his inventory was divided into ten departments and he tracked sales manually. Now the inventory is broken down into 32 departments, and he retrieves information that he just couldn't get before.

Each evening, Feizi pulls a sales-tax report, a cost-of-goods-sold report, and detailed summaries of each department's invoices. He can also break down department sales by item, vendor, and salesperson, as well as by individual customer activity and both daily and year-to-date dollar sales vol-

ume. Every month he generates reports on back orders, stock status, and dead inventory. The system generates invoices and posts payments at the point of sale.

About the only thing the Atkinson system doesn't do is general ledger accounting, which is available in most other POS packages but is not yet widely used by mom-and-pop retailers. Feizi, however, would like it: "It would be much nicer to have double-entry accounting integrated with the point-of-sale system." As it is, he spends about an hour a day rekeying data into an accounting program from another supplier.

Feizi had no problem installing his system, although it took three months for three people to convert from a manual setup. Since Balboa Office Supply is also a computer dealer, technical support isn't the issue for Feizi that it is for most retailers.

Support was a much taller hurdle for Dave Cole of Action Hobbies in Tulsa, who admits that he "could hardly format a disk" when he bought *Quick Register* four years ago. Still, he was brave enough to order the software through the mail, after reviewing the company's \$20 demo disk.

After 15 years in business, Cole doubled sales in his first year of automation. "It would not have been possible without the software," Cole says flatly. He runs *Quick Register* on an XT clone.

One off-the-shelf package, *The General Store* by Crichlow Data Sciences, proved so easy to use that it made a computer dealer out of a hardware store owner. Sam Frazier III, owner of Sam's Home Center in Chester, South Carolina, is another retailer who shopped by mail two years ago. He bought the \$1200 software on the basis of price, and runs it on a Novell network using a Wyse AT as a file server and two XTs.

Frazier's main concern was that *The General Store* wouldn't be fast enough on XTs, but he claims the program "pulls up data almost instantaneously, even with an item file of 5 million bytes." Overall, he was so impressed that he began selling *General Store* networks on the side.

"I've had days when I would have loved to throw the whole thing out," grouses one retailer.

Rudy Keller (pictured far left) of the Swiss Kitchen in Greenbrae, California, has had a tortuous experience with his software.



His POS software so impressed Sam Frazier of Sam's Home Center that he became a computer dealer.

Now, the Bad News

According to Frazier, POS software is well worth its one agonizing price—tedious data entry. Other retailers only wish that data entry were their worst problem.

One battle-scarred user recalls only nightmares with her POS system. "I wanted to blow it up," fumes Barbara Lambert, who runs a chain of clothing stores called Cotton Comfort headquartered in Dallas. Just over a year ago, the chain installed an IBM System 36 minicomputer at headquarters and Epson PCs loaded with proprietary POS software in all 16 stores. "About halfway through the project, I realized that the software wouldn't do what we wanted," recalls Kass Larson, then MIS director of Cotton Comfort. Larson began converting to *Xtrasoft*.

Unfortunately, Cotton Comfort filed for Chapter 11 protection and closed half its stores. New stores will open in 1989 under the name of True Colors, but they will be managed manually and reports will be submitted by fax machines. "That way I can be sure the information is accurate," says Lambert, who was too frustrated with POS systems to try again.

She has a soul mate in Rudy Keller, owner of the Swiss Kitchen gourmet shop in Greenbrae, California. Keller had high hopes for SoftKey Software Products' *KeyRetailer*, which he bought last April, along with an AT clone, a cash drawer, and a Star Micronics receipt printer. But he soon was complaining, "I can't believe such a program goes out to the public." Keller found so many bugs that SoftKey finally refunded \$500 of the \$2000

purchase price. "I have had days when I would have loved to throw the whole thing out," he grouses.

KeyRetailer upgrades, however, solved many of Keller's problems. "Lots of features in the system are good, and some are very good," Keller says now. SoftKey president Kevin O'Leary, who visited Swiss Kitchen to investigate the difficulties, adds that POS systems take time and training. "What Rudy might have perceived as technical problems are installation issues," he claims.

A Menu for Growth

Venture Development Corporation in Wellesley, Massachusetts, estimates that the retail POS market—including systems for large machines—is growing by 30 percent annually. Venture analyst Leone Johnson says specialty stores are experiencing the highest growth in PC system shipments. But the restaurant industry remains the largest market, and it's one of the first outposts for electronic cash register manufacturers that are making the transition to PCs.

One such supplier, TEC America, released its PC-based FT-40 last summer, selling its first systems to a chain of 175 yogurt shops called I Can't Believe It's Yogurt. The FT-40 lists for \$2995 and includes CPU, monitor, receipt printer, and point-of-sale keyboard. The yogurt chain still offers franchisees a \$4500 electronic cash register, but not one has been ordered since the PC-based system shipped. "It's a function of versatility and price," says Buddy Harvey, the chain's operations director.

The Custom Counter

Like other cash register suppliers, TEC America sells primarily through its distributors, but most specialty retailers don't want to buy that way. Apart from the bold few who order software by mail, most retailers look to buy from value-added resellers of computer systems. Retailers with multiple stores, in particular, usually want resellers to customize programs, notes Jerry Paul of The Flagship Group, a Dallas market research firm.

Customization is particularly important to video stores, since most of their business in-

volves rentals rather than sales. Applause Video of Omaha is a case in point. Working with local reseller Information Management Consultants, Chief Financial Officer Joe Riha developed the Diamond Video Management System, which saves Applause 20 percent in labor costs.

Each of Applause's 21 stores has a Novell network with three to seven workstations (each with a bar-code reader) and an AT-compatible file server.

When a customer rents a movie, the sales clerk can call up the customer file by video club membership number, phone number, first name, or last name. The clerk uses the bar-code reader to check the package in or out, and each package has a unique bar-code number.

Transaction data is automatically uploaded to ATs at headquarters every night, letting corporate management pull up to 25 different reports the next day. But even Applause's sophisticated system doesn't integrate general ledger accounting.

Looking for Mr. Good Bar Code

To find the right POS system, look first in your own backyard. Call your industry's trade association and attend its annual convention. Broad-based groups like the National Association of Retail Dealers of America in Chicago, the National Retail Merchants Association in New York City, and the Association of General Merchandise Chains in Washington, D.C., are also good sources.



Once you develop a list of prospective suppliers, grill them. Find out the background of the software developer. You want someone with retail experience, preferably in your industry. And you want a system that's been tested by retailers.

Try to speak with retailers similar to yourself, Riha advises. If you operate a regional chain with stores in suburban strip malls, you want to know how well the system operates in that environment. This may take a lot of phone calls, but the up-front research should save you the frustrations Rudy Keller and Barbara Lambert suffered.

Better you should wind up like Jerry Paul's shoemaker. "He uses a POS system to run a two-employee shop, and he loves it!" ●

Ronnie Gunnerson is a Los Angeles-based writer and frequent contributor to PC World.

POS accounting increased productivity at Balboa Office Supply fourfold, claims Sam Feizi.

WHERE TO BUY

Diamond Video Management System

Information Management Consultants
10824 Old Mill Rd. #7
Omaha, NE 68154
800/234-1685

List price: \$2295

Requirements: 640K, DOS 3.0 or a later version, 30MB or greater hard disk

For more information, circle 610 on reader service card.

FT-40

TEC Americo
2150 W. 190th St.
Torrance, CA 90504
213/320-8900

List price: \$2995

For more information, circle 611 on reader service card.

The General Store

Crichlow Data Sciences, Inc.
P.O. Box 6420
Virginia Beach, VA 23456
804/426-7628

List price: \$995

Requirements: 640K, DOS 2.1 or later version, hard disk

For more information, circle 612 on reader service card.

KeyRetailer

SoftKey Software Products Inc.
260 Richmond St. W #300
Toronto, Ontario M5V 1W5 Canada
416/598-5033

List price: \$2000

Requirements: 640K, DOS 2.0 or a later version, hard disk

For more information, circle 613 on reader service card.

Quick Register

Chuck Atkinson Programs
3737 Romono Dr.
Fort Worth, TX 76116
817/560-7007

List price: \$699

Requirements: 256K, DOS 3.1 or later version

For more information, circle 614 on reader service card.

Xtrasoft

Xtrossoft Inc.
4701 Patrick Henry Dr. #2101
Santo Clara, CA 95054
408/986-9872

List price: \$2995

Requirements: 640K, DOS 3.1 or later version

For more information, circle 615 on reader service card.

PC AND XT ACCELERATOR BOARDS

DON'T TURN THAT PC OR XT INTO A DOORSTOP! 80286 AND 80386 TURBO BOARDS FROM NEARLY A SCORE OF VENDORS CAN BREATHE NEW LIFE INTO THAT TIRED OLD BOX.

ROBERT LUHN

There are a hundred ways to speed up a PC or XT. You can add more system memory, use RAM disk and disk caching software, get a speedier hard disk, or if you're flush, replace the PC's aged motherboard with a form-fit 80386 motherboard.

But for most PC users, an accelerator or "turbo" expansion board built around an 80286, or in some cases an 80386, delivers the biggest boost for the buck. Some of the faster 286 boards—such as the MicroWay Super-Cache-286 and AST Hot Shot/286—can boost XT operation by 200 to 500 percent; 386-based boards can add as much as 1000 percent. Installation is usually straightforward: Pull out the PC's 8088, pop the turbo board into a slot, and connect it to the empty 8088 socket with a special plug. Some boards, like the 386 HummingBoard, don't replace the PC's CPU but act as high-speed coprocessors. Add a few files, and your PC runs like an AT—and then some.

Just keep in mind that not all turbo boards are cut from the same cloth. Although most of the 286 and 386 boards listed here come with their own RAM and can use a numeric coprocessor,

they vary considerably in performance, expandability, and convenience. Before you buy, consider these factors:

How Fast Is Fast? The faster a processor's clock rate (expressed in megahertz, or MHz), the faster the turbo board, right? Yes and no. The number of wait states (the number of processor cycles required to access RAM) can affect throughput dramatically. That's why a turbo board with a 10-MHz 80286 running at zero wait states is faster than a 12-MHz, one-wait-state board. When in doubt, pick the board with the highest clock rate and the fewest wait states.

Warning: Beware of turbo boards bearing "pushed" microprocessors. In their quest for speed (and a quick buck), some manufacturers take chips rated for a given speed and rev up their clock rates. According to Intel, pushed chips may eventually produce erroneous calculations or simply overheat and self-destruct. Ask the board vendor if the processor is certified by Intel for the advertised speed. Look for the "80286-xx" stencil on the microprocessor; the xx denotes the maximum clock rate. (For more on pushed chips, see

Consumer Watch, PCW, November 1988.)

Check That RAM Budget turbo boards often rely solely on the PC's sluggish 8-bit memory. You save money this way but sacrifice speed. Look for 286 and 386 turbo boards that pack lots of *socketed* 16- and 32-bit RAM. For extra zip, pick a board that also includes a memory cache—a high-speed static RAM buffer between the CPU and slower system memory.

How much RAM is enough? If you plan to use stand-alone DOS applications, 1MB is fine. If multitasking environments such as *Desqview* and *Windows* are your dish, or you're brave enough to tackle OS/2, you should probably turn to a 386 turbo board that accommodates at least 4MB of high-speed RAM. Users of every stripe should make sure that a turbo board's RAM can be treated as EMS 4.0 memory.

Hardware and Software Compatibility Most turbo boards work uncomplainingly in 8088-based systems. But only a handful run in speed-switchable 8088 machines such as the Leading Edge PC, and fewer still in 8086 machines such as the Compaq Deskpro.

Compatibility with DOS applications is generally assured, although loading older, copy-protected programs may be impossible if you can't downshift the turbo board to 4.77 MHz. Some boards may also have difficulty loading 1-2-3 from a floppy disk, running *R:base for DOS* at high speed, or displaying *Microsoft Word* documents. Note, too, that 386 turbo boards can't automatically run every 386-specific program out of the box. The Intel Inboard 386/PC, for example, chokes on Concurrent DOS/386, VM/386, and PC-MOS/386 and requires a special version of *Windows/386*. When in doubt about a board's compatibility, follow the Golden Upgrade Rule: Call before you buy.

The OS/2 Conundrum If you're buying a turbo board to run OS/2, think again. Unlike DOS, OS/2 is extremely hardware specific: Unless a turbo board is very compatible with the IBM PC AT (like the Sota 286i) or the vendor goes to the pains of modifying OS/2 (as Microsoft did for the Mach 20), you're out of luck. At press time, only Sota and Microsoft supported OS/2.

Extras Make a Difference Finally, don't forget the bundled goodies. A disk caching program can make a big difference in overall system performance, as can RAM disk programs and print spoolers. If you want to simplify your system's future growth, check out boards that offer high-density floppy disk drive controllers. ●

Robert Luhn is a senior editor for PC World and the editor of The Upgrade Path. John Faulkner researched this article.

WHERE TO BUY

A.I. Architects

One Kendall Sq.,
Bldg. 400
Cambridge, MA 02139
617/577-8052

Applied Reasoning Corp.

86 Sherman St.
Cambridge, MA 02140
617/492-0700

AST Research, Inc.

2121 Alton Ave.
Irvine, CA 92714
714/863-1333

ATD Ave.

1150 Morse Ave.
Sunnyvale, CA 94088
800/222-4920,
408/720-1942

Everex Systems, Inc.

48431 Milmont Dr.
Fremont, CA 64538
415/498-1111

Intel Corp.

5200 N.E. Elam Young
Pkwy.
Hillsboro, OR 97124
800/538-3373,
503/629-7402

Microsoft Corp.

16011 N.E. 36th Way
Box 97017
Redmond, WA 98073
800/426-9400,
206/882-8080

Microspeed, Inc.

5307 Randall Pl.
Fremont, CA 94538
415/490-1403

MicroWay, Inc.

P.O. Box 79
Kingston, MA 02364
508/746-7341

Mini Micro Supply Co.

2050 Ringwood Ave.
San Jose, CA 95131
408/434-6859

Mountain Computer, Inc.

240 Hacienda Ave.
Campbell, CA 95008
800/458-0300,
408/379-4300

Ocean Interface Co.

P.O. Box 1666
Monterey Park, CA
91754
818/284-3742

Orchid Technology

45365 Northport
Loop W
Fremont, CA 94538
415/683-0300

PCSG (PC Support Group)

17950 Preston Rd. #800
Dallas, TX 75252
214/404-4000

PC Technologies, Inc.

704 Airport Blvd.
Ann Arbor, MI 48108
313/996-9690

Quadram Corp.

One Quad Way
Norcross, GA 30093
404/923-6666

Seattle Telecom & Data, Inc.

12277 134th Ct. NE
Redmond, WA 98052
206/883-8440

Sota Technology

657 N. Pastoria Ave.
Sunnyvale, CA 94086
408/245-3366

(See chart on following pages.)



BUD PEEN

PC AND XT ACCELERATOR BOARDS

MANUFACTURER Product	List price (including min. RAM required)	Type/speed	Wait states	Board/ processor replaces PC's CPU	Speed switchable	Numeric coprocessor supported (type/speed)	RAM included	RAM max.	RAM speed (in ns)
A.I. ARCHITECTS									
386 HummingBoard	\$1595	80386/16	0	no	na	80387/16	1MB	24MB	120
386 HummingBoard	\$1995	80386/20	0	na	na	80387/20	1MB	24MB	100
386 HummingBoard	\$2595	80386/25	0	na	na	80387/25	1MB	24MB	80
APPLIED REASONING									
PC-Elevator 386	\$1795	80386/16	0	na	no	80387/16	1MB	13MB	100
AST RESEARCH									
Hot Shot/286	\$545	80286/10	0	yes	yes	80287/8, 10	n/a	n/a	n/a
ATD									
286 Accelerator Board	\$359	80286/12	0	yes	na	80287/5, 8, 12	n/a	n/a	n/a
EVEREX SYSTEMS									
EverTurbo/12	\$409	80286/12	0	yes	yes	80287/10	n/a	n/a	n/o
INTEL									
Inboard 386/PC	\$1095	80386/16	2-4	yes	yes	80387/16	1MB	5MB	120
MICROSOFT									
Mach 20	\$495	80286/8	0	yes	yes	80287/5	0	3.5MB	150
MICROSPEED									
Fast 88, FA-100	\$129	8088-2/8	0	yes	yes ⁴	8087-2/8, 8087-1/10	n/a	n/o	n/a
Fast 88, FA-120	\$149	NEC V20/8	0	yes	yes ⁴	8087-2/8, 8087-1/10	n/a	n/a	n/a
MICROWAY									
FastCache-286	\$199	80286/9.54	n/a	yes	yes	80287/6, 10	n/a	n/a	n/a
FastCache-286	\$299	80286/12	n/a	yes	yes	80287/6, 10	n/a	n/a	n/a
SuperCache-286	\$399	80286/12	n/a	yes	yes	80287/10, 12	n/a	n/a	n/o
Number Smasher/ECM	\$399	8086/10	n/a	yes	yes	8087/10, 12	512K	1MB	150
Number Smasher/ECM	\$599	8086/12	n/a	yes	yes	8087/12	1MB	1MB	150
MINI MICRO SUPPLY									
TurboCache 286	\$495	80286/10	1	yes	yes	80287/6, 8, 10	n/a	n/a	n/a
MOUNTAIN COMPUTER									
Mountain Racecard 286	\$495	80286/10	1	yes	no	80287/5, 8, 10	n/a	n/a	n/a
OCEAN INTERFACE									
286 Speed Card	\$399	80286/10	1	yes	yes	80287/6, 8	n/a	n/a	n/a
ORCHID TECHNOLOGY									
TinyTurbo 286	\$445	80286/8	0	yes	yes	80287/5, 8	n/o	n/o	n/a
TwinTurbo 12	\$645	80286/12	0	yes	yes	80287/6, 8, 12	n/a	n/a	n/a
PCTurbo 286e-10	\$1295	80286/10	0	na	yes	80287/8, 12	1MB	2MB	100
PCSG (PC SUPPORT GROUP)									
Breakthru 286-8	\$395	80286/10	0	yes	yes	80287/6, 8	n/a	n/a	n/a
Breakthru 286-12	\$595	80286/12	0	yes	yes	80287/6, 8, 10	n/a	n/a	n/a
PC TECHNOLOGIES									
286 Express-8	\$275	80286/8	0	yes	yes	80287/6, 8	n/a	n/a	n/a
286 Express-12	\$395	80286/12	0	yes	yes	80287/6, 8, 10	n/o	n/a	n/a
286 Express-16	\$530	80286/16	0	yes	yes	80287/6, 8, 10	n/a	n/o	n/a
286 Express/30-12	\$395	80286/12	0	yes	yes	80287/6, 8, 10	n/a	n/a	n/a
286 Express/30-16	\$530	80286/16	0	yes	yes	80287/6, 8, 10	n/a	n/a	n/a
286 RAMracer	\$345	80286/8	0	yes	yes	80287/6, 8	0	2MB ⁶	150
QUADRAM									
Quad 386XT-16	\$1195	80386/16	0	yes	no	80387/16, Weitek 3167, 1167	1MB	3MB	120
Quad 386XT-20	\$2295	80386/20	0	yes	no	80387/20, Weitek 3167, 1167	1MB	3MB	100
SEATTLE TELECOM & DATA									
PC286-10	\$795	80286/10	0 or 1	yes	na	80287/5, 6, 8, 10	640K	8MB	120
PC286-12.5	\$995	80286/12.5	0 or 1	yes	yes	80287/5, 6, 8, 10	640K	8MB	100
STD3270PC	\$995	80286/10	0 or 1	yes	yes	80287/5, 6	640K	8MB	120
SOTA TECHNOLOGY									
286i	\$395	80286/10	0	yes	yes	80287/5, 8, 10	0	4MB	100
286i	\$495	80286/12.5	0	yes	yes	80287/5, 8, 12.5	0	4MB	100

n/a = not applicable

¹ Legend
R=RAM disk program
D=disk cache program
P=print spooler

² Limited to cache, RAM disk, or print spooler.

³ Only via OS/2.

⁴ Hardware switch, \$20 extra.

⁵ Supports only EMS 3.2.

⁶ EMS 4.0 memory only.

RAM chips socketed	Supports EMS 4.0	Supports extended memory	RAM cache (in K)	Supports OS/2	Works in dual-speed 8088 machines	Works in 8086 machines	Uses PC's motherboard memory	Disk controller option	Bundled utilities ¹	Initial warranty	Extended warranty	Toll-free technical support	Reader service number
yes	yes	yes	12	no	yes	yes	yes	no	n/a	1 year	no	no	720
yes	yes	yes	12	no	yes	yes	yes	no	n/a	1 year	no	no	720
yes	yes	yes	12	no	yes	yes	yes	no	n/a	1 year	no	no	720
yes	yes	yes	n/a	no	yes	yes	yes ²	no	R, D	1 year	yes	no	721
n/a	yes	yes	16	no	yes	no	yes	no	R, P	2 years	no	no	722
n/a	no	no	8	no	yes	no	yes	no	D	2 years	no	no	723
n/o	yes	no	8	no	yes	no	yes	no	n/a	1 year	no	no	724
no	yes	yes	n/a	no	yes	no	no	no	D	5 years	no	yes	725
yes	yes	yes ³	16	yes	yes	no	yes ²	yes	D	2 years	no	no	726
n/a	yes	yes	n/a	no	no	no	yes	no	n/a	1 year	yes	no	727
n/a	yes	yes	n/a	no	no	no	yes	no	n/a	1 year	yes	no	727
n/a	yes	yes	8	no	yes	no	yes	no	R, D, P	1 year	no	no	728
n/a	yes	yes	8	no	yes	no	yes	no	R, D, P	1 year	no	no	728
n/o	yes	yes	32	no	yes	no	yes	no	R, D, P	1 year	no	no	728
no	yes	yes	n/a	no	no	no	yes	no	R, D, P	1 year	no	no	728
no	yes	yes	n/o	no	no	no	yes	no	R, D, P	1 year	no	no	728
n/a	yes	yes	8	no	no	no	yes	no	R, D, P	1 year	no	no	729
n/o	no	no	8	no	no	no	yes	no	n/a	1 year	no	no	730
n/a	no ⁵	yes	8	no	yes	no	yes	no	R, D	1 year	no	no	731
n/o	yes	no	8	no	no	no	yes	no	n/a	4 years	no	no	732
n/a	yes	no	8	no	yes	no	yes	no	R, D, P	4 years	no	no	732
no	no	yes	n/a	no	yes	yes	yes ²	no	R, D, P	4 years	no	no	732
n/o	yes	no	16	no	yes	no	yes	yes	D	1 year	no	no	733
n/a	yes	no	16	no	yes	no	yes	yes	D	1 year	no	no	733
n/a	yes	no	8	no	no	no	yes	no	n/o	2 years	no	yes	734
n/o	yes	no	16	no	yes	no	yes	no	n/a	2 years	no	yes	734
n/a	yes	no	16	no	yes	no	yes	no	n/o	2 years	no	yes	734
n/a	yes	no	16	no	yes	yes	yes	no	n/a	2 years	no	yes	734
n/a	yes	no	16	no	yes	yes	yes	no	n/a	2 years	no	yes	734
yes	yes	no	8	no	no	no	yes	no	R, D, P	2 years	no	yes	734
no	yes	yes	yes	no	yes	no	yes	no	R, P	1 year	no	no	735
no	yes	yes	n/a	no	yes	no	yes	no	R, P	1 year	no	no	735
yes	no ⁵	yes	n/a	no	yes	no	no	no	R, D, P	1 year	yes	no	736
yes	no ⁵	yes	n/a	no	yes	no	no	no	R, D, P	1 year	yes	no	736
no	no ⁵	yes	n/o	no	yes	no	no	no	R, D, P	1 year	yes	no	736
no	yes	no	16	yes	yes	yes	yes	yes	R, D, P	2 years	no	yes	737
no	yes	no	16	yes	yes	yes	yes	yes	R, D, P	2 years	no	yes	737

Lasersharp R:base Reports

Use printer variables and escape sequences to print good-looking, formatted reports directly from R:base—

with your HP LaserJet or compatible printer.



Data Bases

**Karen
Watterson**

Do you remember the hollow feeling in the pit of your stomach when you first looked in your LaserJet printer manual and glimpsed the long, complicated escape sequences that select printer features? If you're like most of us, the first thing you did was install a canned LaserJet driver for your word processing program, and let the driver worry about sending all those codes for font changes, landscape printing, box creation, and so on.

Then you tackled Microrim's *R:base*, which has no LaserJet driver—or any other printer driver, for that matter. To print a report using custom print options, you must include the escape codes in the report itself.

Fancy Fontwork

Print options that won't change during printout can be set once before you print, via the control

panel (if your LaserJet compatible has one), or a printer setup program (if it doesn't). But if you want to do any fancy fontwork in your *R:base* report—or use shading, lines, or boxes—you'll have to master LaserJet escape sequences.

Some escape sequences must be sent to the printer exactly as you see them in the manual; others include a # as a placeholder, indicating that you must fill in a value. However, in no case can you simply type the escape codes into your report; you must translate them into *R:base*-ese by defining and locating *printer variables* with Reports Express, *R:base*'s report generator.

Landscape Printing Tutorial

Because data base reports are often tabular, the ability to print

them in landscape mode is essential. Your printer manual probably lists the necessary escape sequence as follows:

Select Landscape Mode $\text{E}_\text{C} \& \text{l}10$

This means that if you want to print in landscape mode, you have to send the printer the Escape character (E_C) followed by the characters **&l10**.

To translate this escape sequence into an *R:base* printer variable, follow this procedure:

1. From the **R>** prompt, type **Reports** and press **<Enter>** to bring up Reports Express.
2. Choose a data base (unless you already have one open).
3. Choose (1) (*Edit/Create a report*) from the Report Options menu.
4. If you already have reports created, select the one to edit. If you want to create a new one, choose (*New*) from the Choose a report menu. If you choose (*New*) (or if you have never created a report with this data base), you will be prompted to give the report a name and to select the table or view on which it will be based. Once you do so, you will move automatically into the Report Definition menu.
5. Select *Expression* from the Report Definition menu.
6. Select *Define* from the Expression menu.
7. Type **land = <27 38 108 49 79>** and press **<Enter>**. The numbers inside the angle brackets are the decimal ASCII codes for Escape (ASCII 27), ampersand, lowercase *l*, the numeral one, and uppercase *O*.
8. Press **<Esc>** to redisplay

Reset printer to default	$\text{E}_\text{C}\text{E}$	<27 69>
Specify landscape orientation	$\text{E}_\text{C}\&\text{l}10$	<27 38 108 49 79>
Specify portrait orientation	$\text{E}_\text{C}\&\text{l}00$	<27 38 108 48 79>
Compressed print, e.g., line printer	$\text{E}_\text{C}(\text{s}16.66\text{H}$	<27 40 115 49 54 46 54 54 72>
Use legal paper from legal tray	$\text{E}_\text{C}\&\text{l}84\text{P}$	<27 38 108 56 52 80>
Use legal paper from legal tray (Series II)	$\text{E}_\text{C}\&\text{l}3\text{A}$	<27 38 108 51 65>
Specify soft font defined as font 1	$\text{E}_\text{C}(\text{lX}$	<27 40 49 88>
Italics on	$\text{E}_\text{C}(\text{s}1\text{S}$	<27 40 115 49 83>
Italics off	$\text{E}_\text{C}(\text{s}0\text{S}$	<27 40 115 48 83>
Underline on	$\text{E}_\text{C}\&\text{d}3\text{D}$	<27 38 100 51 68>
Underline off	$\text{E}_\text{C}\&\text{d}@\text{}$	<27 38 100 64>
Print 2 copies (50 is ASCII for 2)	$\text{E}_\text{C}\&\text{l}2\text{X}$	<27 38 108 50 88>
Print 8 vertical lines per inch	$\text{E}_\text{C}\&\text{l}8\text{D}$	<27 38 108 56 68>

FIGURE 1: Popular escape sequences translated into *R:base* report variables

the Expression menu. Press **<Esc>** again to redisplay the Report Definition menu.

Now you need to decide where in your report you want the landscape command to take effect. Since you will rarely want to change page orientation within the body of a report, the main choices have to do with using different options for cover sheets and page headings.

Information to appear on the cover sheet is entered on RH (Report Header) lines; information to appear at the top of every page is entered on PH (Page Header) lines.

Let's assume you want to print page 1, the cover sheet, in normal mode, and the rest of the report, starting with page 2, in landscape mode.

9. Select *Edit*.

10. If this is a new report, or if you've previously created a report header, your cursor will probably already be on an RH line; otherwise, check the status line, press **<F9>** to toggle Expand on if necessary, and use **<F7>** to create an RH line.

Then type cover sheet text on the RH line(s).

11. When you're finished entering the cover sheet text, press **<F8>** to move into the Page Header section. The cursor will be on a PH line. Even if you do not plan to use any page headers, you can still place your printer variable here.

12. To place the variable "land" in the report, press **<F6>** **<Enter>** **<Enter>**, and then select *Land* from the Locate variable menu. Press **S** and **E** in response to the prompt; there's no need to move the cursor. Type any text you want to appear as a page header, making sure to indent for margins.

13. When you've finished entering your page header text, press **<Enter>** one or more times to insert blank lines between the header and the Detail section. **<F8>** moves you into the Detail section. With the cursor on a D line, press **<F6>** to begin locating fields from your data base on the report layout.

14. Press **<F8>** to move into Page Footer and Report Footer sections, if desired. You should also define a "reset" variable (see **FIGURE 1**) and locate it on the last RF (Report Footer) line. This will return your printer to portrait mode at the end of the print cycle.

15. When you've finished, press **<Esc>** and select *Configure* from the Report Definition menu.

16. Change the FORM FEEDS After Report Header setting from NO to YES to start landscape printing on a new page.

17. Press **<Esc>** twice to move to the Report Exit Options menu.

18. Press **<Enter>** to save changes.

19. Select (6) to exit.

That's it. Now when you tell *R:base* to OUTPUT PRINTER and PRINT *rptname*, it will start printing the report; when it encounters the variable "land," it will send the escape sequence that tells the printer to shift to landscape mode. Voilà!

FIGURE 1 lists some escape sequences for selecting fonts and other popular features. You can place these variables on RH or PH lines. You can also place printer variables on Break Header (H1, H2...) or Break Footer (F1, F2...) lines to invoke, or turn off, fonts or effects for new sections.

Creating a Report With Shaded Rectangles and Custom Lines

Suppose you want to jazz up the first page of an otherwise uninspiring summary report of sales data so that it looks like **FIGURE 2**, complete with shaded rectangles

JOHN COMPANY CONSOLIDATED SALES REPORT	
Smith	\$128,445.00
Jones	\$31,789.00
Miller	\$74,281.00
Adams	\$48,419.00
Miller	\$26,890.00
Baker	\$89,532.00
Miller	\$101,872.00
Teasdale	\$79,251.00
Martin	\$125,912.00
Garmish	\$73,291.00
Johansen	\$36,100.00
Metzger	\$8,122.00
Gary	\$57,920.00
Schneider	\$97,943.00
Watterson	\$93,502.00
Behrens	\$42,618.00

FIGURE 2: An R:base sales report printed with lines and shaded rectangles

and custom lines. (You'll need at least a LaserJet Plus for these effects.)

We'll use a combination of three escape sequences:

EC*p#x#Y To position the cursor at location #, #.

EC*c#a#b0P To draw a line #

dots wide and # dots high.

(Note: If the value for the first # is greater than the second #, the line is horizontal; if the value for the second # is greater, the line is vertical.)

EC*c#a#b#g#P To draw a box

- 1: TEXT : reset = <27 69>
- 2: TEXT : locate1 = <27 42 112 49 53 48 120 49 53 48 89>
- 3: TEXT : line1 = <27 42 99 50 49 48 48 97 51 98 48 80>
- 4: TEXT : box1 = <27 42 99 50 49 48 48 97 55 48 48 98 49 48 103 50 80>
- 5: TEXT : line2 = <27 42 99 51 97 50 55 48 48 98 48 80>
- 6: TEXT : locate2 = <27 42 112 50 50 53 48 120 49 53 48 89>
- 7: TEXT : locate3 = <27 42 112 49 53 48 120 50 55 48 48 89>
- 8: TEXT : box2 = <27 42 99 50 49 48 48 97 49 53 48 98 49 48 103 50 80>
- 9: TEXT : locate4 = <27 42 112 49 53 48 120 50 56 53 48 89>

FIGURE 3: R:base printer variables used to produce the report in **FIGURE 2**

dots wide by # dots high with # percent shading and # type of fill.

FIGURE 3 shows pretranslated *R:base* printer variables for the report in **FIGURE 2**, based on these escape sequences. "Locate1" positions the cursor at 150,150 (½ inch down and ½ inch in from the top-left corner; remember, the LaserJet prints 300 dots per inch). "Line1" directs the printer to print a horizontal line 2100 dots (7 inches) long and 3 dots thick. "Box1" draws a 10 percent gray-scale shaded box 2100 by 700. "Line2" prints a vertical line 2700 dots high and 3 dots thick. "Locate2" positions the cursor at 2250,150. "Locate3" positions the cursor at 150,2700. "Box2" draws a 10 percent gray-scale shaded box 2100 by 150. "Locate4" positions the cursor at 150,2850.

Creating a Printer Variable With Replaceable Parameters

As an exercise, here are step-by-step instructions for creating one of the variables with replaceable parameters, "locate1." This will position the cursor at 150,150.

1. Write down the original escape sequence:

`EC * p # x # Y`

2. Substitute data:

`EC * p 150 x 150 Y`

3. Referring to an ASCII table, convert the characters

`EC * p 1 5 0 x 1 5 0 Y` to decimal ASCII codes:

`27 42 112 49 53 48 120 49 53 48 89`

4. Using Reports Express, define the expression "locate1" as a TEXT variable by entering the code from step 3: `locate1 = < 27 42 112 49 53 48 120 49 53 48 89 >`

Once you've defined all the variables in **FIGURE 3**, use Reports

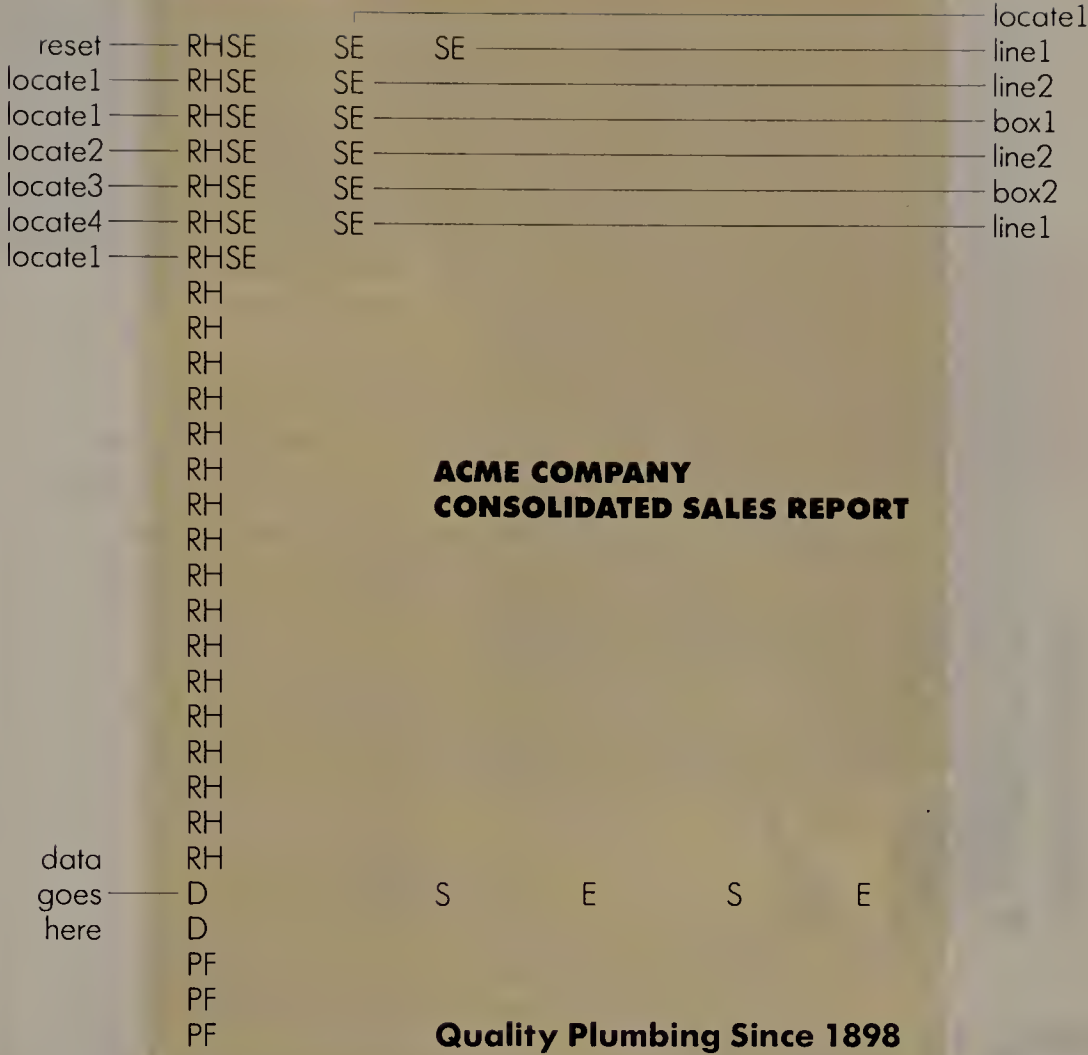


FIGURE 4: Placement of R:base printer variables used to produce the report in **FIGURE 2**

Express to locate them on RH lines in your report, following the procedure previously outlined for locating the variable "land." Proper location is shown in **FIGURE 4**.

A Few Final Thoughts

Make sure your printer offers a certain feature before you spend fruitless hours trying to figure out why your escape code isn't working. It won't do any good to send an escape sequence to select 24-point characters if your printer has no 24-point fonts.

Don't let your pride keep you from considering an end run. Since *R:base* lets you send a report to a disk file, one way to customize a report is to save it to a file and then edit it with a word

processing program that has its own LaserJet printer driver.

Finally, don't forget to send a NEWPAGE command (from the R> prompt) after printing a report to eject the final page:

OUTPUT PRINTER

`PRINT rptname`

`NEWPAGE`

OUTPUT SCREEN

Be patient, work carefully, and take your time. Creating, locating, and debugging printer variables can be tedious, but the process puts *you* in control of your LaserJet—rather than the other way around. ●

Karen Watterson teaches computer applications at Shoreline Community College in Seattle and is coauthor of Understanding R:base (Sybex, San Francisco, 1988).

TIPS &
TECHNIQUES

Data Bases

How to Design a Data Base File

Want intelligent answers from a data base? Start by creating an intelligent file structure. A few rules of thumb make it easy.

What you need: any data base management program

If you use a PC to keep records of any kind, you're a data base manager. And unless you want that data base to start managing you, it makes sense to set it up right in the beginning.

This piece will show you how to design a simple, single-file data base that uses a minimum of storage space, is easy to search and sort, and resists careless mistakes. (A future article will cover data bases that consist of multiple, related tables.) The specific examples here

refer to *dBASE*, but the underlying principles are true whatever program you use, anything from *RapidFile* to *Paradox*.

All data base files have a tabular structure. Data is arranged much as it is in a spreadsheet; the column headings are fields, and the rows are records. Designing a data base is mainly a matter of choosing the field names, their widths, and the type of data that goes into them.

Turn Facts Into Fields

Say you've gone to work for the alumni association at your old alma mater, Dragnet University, and you need to track donations to the alumni fund. After a little thought, you decide that to answer the dean's questions, produce reports, and manage a mailing list, you'll need to track a lot of facts about each of the alumni: name, student ID number, class year, address, phone number, degree, department, number of years' membership in the association, yearly income, amount of donation, and donation as a percentage of income.

The items on this list will be only roughly equivalent to the fields in the data base. A few guidelines can help you translate these categories into an array of fields that will yield a bulletproof file structure.

Creating an Optimum Table Structure

When in doubt, break it out! If you're faced with a choice of creating one wide field or several smaller fields, it's always better

to choose the latter. It's much easier to combine small fields into a larger expression later on than to split a large field into smaller pieces.

For just the first line of an address on a simple form letter, you'll need no fewer than six fields: Salutation (Mr., Ms., etc.), First, Middle, Last, Suffix (Jr., etc.), and Nickname. With these, you'll be able to customize the correspondence and sort by last name.

It's a character field unless... Numeric fields are for calculations; date fields are for dates and durations. With few exceptions, everything else should be a character (or text) field. The classic example is Zipcode. Though composed of digits, this is a character field, because zip codes are never used in calculations. (Some data base managers have a special field type for numeric labels.) In the alumni records, Studentid and Phone are also character fields.

Make character fields as wide as necessary but as narrow as possible. Most data base managers reserve the same amount of disk space for each record in a file, whether the fields contain data or not. So watch field length carefully; widening a field even by a character can take up a lot of space in a large data base.

Some character fields must be wide enough for the longest possible entry—name fields, for example. Others can be shortened by means of a coding system. In

FREE GIFT!

**And 44%
Savings**
If You Order Now!



This *PC World* see-through solar calculator can be yours FREE just for subscribing to *PC World*. Your special gift features:

- Amazing crystal-clear body
- Credit card size
- Multi-function memory
- Special function keys
- Liquid crystal display
- Advanced solar panel cell—it never needs batteries!

☐ Rush me my FREE GIFT and one year (12 monthly issues) of *PC World* for only \$19.97. That's almost 44% off the annual cover price and over 33% off the regular subscription rate of \$29.90.

NAME _____

COMPANY _____

TITLE _____

ADDRESS _____

CITY/STATE/ZIP _____

Don't wait. If you act now you can have a full year of PC World for only \$19.97—that's almost 44% off the cover price.

PC WORLD

4CN62



NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
Subscription Department
P.O. Box 51833
Boulder, Colorado 80321-1833



the alumni data base's Department field you could use ASTR for Astronomy, for instance. This can also cut data entry errors.

For numeric fields: "A little wider, please." Leave some extra room in numeric fields for later growth and for calculations and subtotals. In our example, Income and Donation are numeric fields.

Include a unique field. Every data base needs a field that uniquely identifies a record: a social security number, part number, transaction number, and so on. Having such a field eliminates confusion between records containing similar data and makes it easy to purge duplicate records. (For the alumni association, the unique field is Student-id.) In more complex relational data base designs, the unique field provides a link between related tables.

Avoid redundant fields. Never include fields that can be derived from the entries in other fields. This saves disk space, since you can always calculate the information when you need it. (This rule will sometimes be violated in complex data base designs created under *dBASE*; other data base managers, such as *DataPerfect*, provide virtual or calculated fields that are stored separately from the data.) In the alumni group system, you don't need a field for donation as a percentage of income, for example; you can perform the Donation/Income calculation wherever the figure is needed.

Use date fields for durations. Don't use a numeric field to show the number of years of an alumnus's membership; you'd only have to update it every year. Instead, create a field called Joined

Records	Go To	Exit
FIRST	Smith	
MIDDLE	P.	
LAST	Brownstone	
SALUTATION	Dr.	
SUFFIX		
NICKNAME	Edi	
STREET	1900 North Adams St.	
CITY	New Brunswick	
STATE	NJ	
ZIPCODE	08421	
PHONE	(516)824-3122	
CLASS	1937	
STUDENTID	74361	
DEGREE	MS	
DEPARTMENT	ESDC	
INCOME	56000	
DONATION	1000	

Edit | D:\dbase4\STUDENTS | Rec 1/1 | File | 5:15:54 pm

For an efficient data table, make character fields no wider than necessary but give numeric fields a little room to grow.

to record the date the alumnus joined the association. Then, whenever you need to know how long a member has belonged, you can calculate the duration by subtracting Joined from the current date.

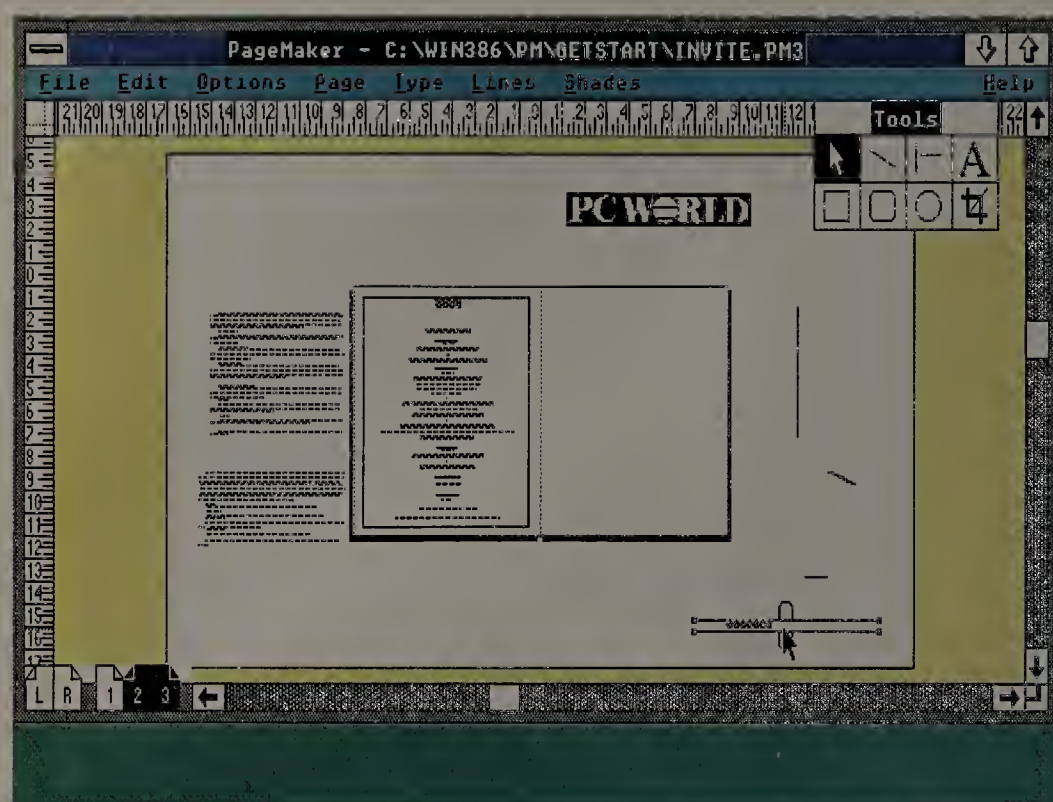
Provide for subtotals. Be sure to include a field to keep track of specific groups among the alumni, so you can separate them later. With many data base managers, including *dBASE III*, the best way to count the number of records in many subgroups is to include a numeric field with a value of 1 for every record. Totalling on this field gives the desired counts.

Since Dragnet U.'s dean will want to know the number of members and the total donations by class, state, and degree level, grouping fields for the alumni file would include Class, Degree, and State. A field called COUNT lets you count the members in each category.

Use a comments field for flexibility. The alumni data base can include many facts about the

members, including spouse's name, sport, fraternity or sorority, children, and so on. And it can be handy to identify subgroups with similar interests; aging tennis players may want to help rebuild the field house someday. The trick is to put the facts into the data base without losing track of them.

Many data base managers allow a floating search (in *dBASE*, the \$ function), which lets you search for a string of characters anywhere within a field. For the alumni data base, create a wide Comments field, enter data using a coding system (for example, "SP-Tennis" to indicate that an alumnus's sport was tennis), then use the floating search to locate all alumni with that sport. *dBASE III Plus* includes variable-length memo fields, but they can't be searched, so Comments must be a character field, which wastes disk space. By contrast, *Professional File* and several other packages let you search memo fields.



<Ctrl>-<Shift>-W displays the entire PageMaker work area.

Moving From the Simple to the Complex

If you've gotten this far, you've completed your assignment. You have set up the alumni data base, and hordes of work-study students are busy punching in data. You may have noticed that since several alumni sent in more than one gift, you've had to enter them in the data base more than once. This is a minor inconvenience for now, but perhaps you're wondering what will happen next year and the year after, as some alumni give a number of gifts. If you don't do something about it, you'll be wasting a lot of space on duplicate entries, and the burden of listing and counting the alumni will worsen.

The problem is that the data base is really storing data about two distinct entities, alumni and their donations, and there is a one-to-many relationship between them. In a future article,

we'll extend the single-file alumni association model to a true multitabled relational design.

—Richard Scoville



Desktop Publishing

PageMaker Speedup Tips

A few timesaving techniques let you experience that rare PageMaker quality—velocity.

What you need: PageMaker 3.0

Although *PageMaker*'s thorough printed tutorial gives novices a good leg up, regular users may soon lose patience with the program's mouse-dependent,

multimenu operations. Coaxing proofs, much less finished publications, out of a laser printer can be equally taxing.

But *PageMaker* has some underemphasized, and even undocumented, shortcuts that can help. This collection of keyboard, mouse, and LaserJet printer tips shows you how to use *PageMaker* more quickly and efficiently. All the techniques work with version 3.0, and a few, as noted, will work with 1.0 and 1.0a.

Keys to Success

The most obvious way to accelerate a *PageMaker* session is to bypass the program's many-layered menus with keyboard shortcuts. As with any *Windows* program, you can drop down *PageMaker*'s main menus by holding <Alt> and typing the underscored letter of the menu heading. To execute a menu option, just type the underscored letter. But there are lots more speed tricks, and they work with any version of *PageMaker*.

Select Tools With Function Keys

When you're sculpting a page to match your visions, you want the proper tools instantly at hand. Instead of dragging the mouse pointer away from the page to *PageMaker*'s Toolbox, simply select the tool by pressing <Shift> and the appropriate function key (see **FIGURE 1**). Once you memorize the function key assignments, you can remove the Toolbox and free up valuable screen space.

Change Views From the Keyboard

PageMaker's menus list numerous mnemonic <Ctrl>-key shortcuts that can shoot you to a specific command or dialog box,

Tandy® Computers: The broadest line of PCs in America.

The Tandy 5000 MC

Our most
powerful 386™
based computer
...made in America.

The remarkable Tandy 5000 MC Professional System is pure performance, from the Intel® 80386 processor operating at 20 MHz to the high-speed memory with cache controller that provides RAM-fast access to your data.

With the 5000 MC, you have the high-performance platform needed to take full advantage of industry-standard MS-DOS® applications, powerful new MS® OS/2 programs or multiuser SCO™ XENIX® software.

Operating at 20 MHz, the 5000 MC cuts through the big jobs like database management, large spreadsheets and sophisticated graphics. And with its IBM® MicroChannel™ compatible architecture, the 5000 MC is the ideal high-end PC workstation.

The system architecture also provides an increase in data-transfer rates when the 5000 MC is configured within a 3Com® workgroup or a XENIX multiuser environment.

The Tandy 5000 MC is the new alternative in personal computing.

Send me a 1989 RSC-20 computer catalog.

Mail to: Radio Shack, Dept. 89-A-730
300 One Tandy Center, Fort Worth, TX 76102

Name

Company

Address

City State

ZIP Phone

Tandy Computers: Because there is no better value.™

Intel/Reg. TM Intel Corp. IBM/Reg. TM and Micro Channel/TM IBM Corp. MS, MS-DOS and XENIX/Reg. TM Microsoft Corp. SCO/TM The Santa Cruz Operation. 3Com/Reg. TM 3Com Corp.

Radio Shack®
COMPUTER CENTERS

A DIVISION OF TANDY CORPORATION

Circle 212 on reader service card

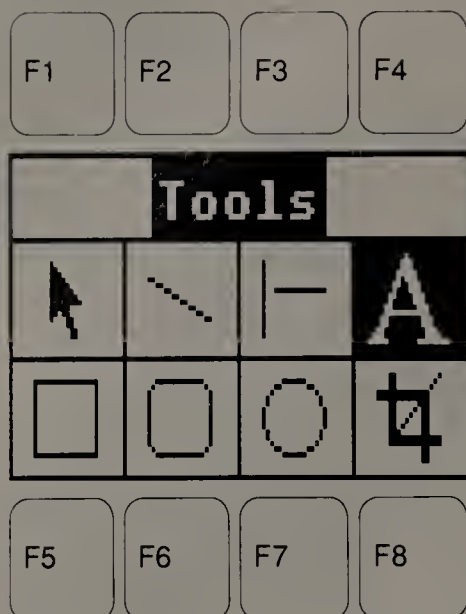


FIGURE 1: Toolbox function-key assignments

skipping intervening menu steps. For example, instead of plodding through the Page menu to change views, <Ctrl>-5, -7, -1, and -2 instantly switch to 50, 75, 100, and 200 percent views, respectively. An undocumented 3.0 shortcut, <Ctrl>-4, even offers 400 percent magnification—perfect for kerning and precise graphics placement. This is one feature that you can't access with a mouse.

Display the Entire Pasteboard The <Ctrl>-W shortcut (Fit in Window view) quickly displays an entire page on the screen—but stray text or graphics on *PageMaker's* pasteboard could still be lurking off screen. To get the ultimate aerial view of the pasteboard, type <Ctrl>-<Shift>-W. Because pasteboard leftovers are saved with a document, you can free up valuable disk space by purging such clutter regularly.

Clever Mousework

Liberating your mouse from tedious menu work doesn't mean the rodent can retire. Some of *PageMaker's* most powerful shortcuts are just a click away.

The following mouse tricks work with any version of the program.

Use the Second Button Need to zoom in and out like Spielberg? Click the second mouse button, and *PageMaker* toggles between Actual Size (100 percent) and Fit in Window views. To jump between Actual Size and 200 percent views, hold down <Shift> and click the second mouse button.

Point First, Then Zoom It's easy to lose your place when leaping from one view to another. To keep the same portion of a page in sight, place the pointer on the desired spot, and then select the view from the Page menu or by clicking the second mouse button. This trick works whether you're zooming in or out of a page, but if you get lost, select the Fit in Window view, reposition the mouse pointer, and start over.

Printing Apace

Even if you have a jumbo high-resolution screen, the best way to check your design is to print it out. Unfortunately, printing is *PageMaker's* single most time-consuming function. Luckily, there are ways to cut printing time, especially when proofing. The following tips all work on LaserJet and compatible printers.

Select Draft Resolution *PageMaker's* Macintosh version has a Proof Print feature that speeds printing by suppressing graphic images. Although all versions of *PageMaker* for the PC lack this text-proofing godsend, you can reduce print time dramatically by reducing graphics resolution.

Before clicking the OK button in the Print dialog box, click the Setup button. In the resulting dialog box, set graphics resolution to the lowest setting—75 dots per inch. Depending on the mixture of text and graphics, documents can roll out of the printer in a third of the time. Until you print your final master copy, keep 75 dpi as the default option.

Use Fast Rules *PageMaker* is an ace at generating and manipulating boxes, column rules, and other line art, but printing out a graphics-laden masterpiece can take hours. If you're in a rush (and you have *PageMaker 3.0*), select the Fast Rules option in the Print dialog box, and the document will print out in record time. Note: Don't use Fast Rules for final copy if line art is stacked or masked by other elements on the page—everything will show through when printed.

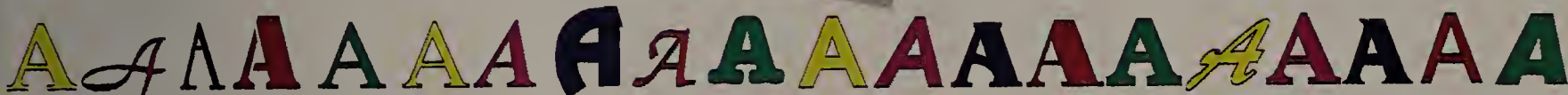
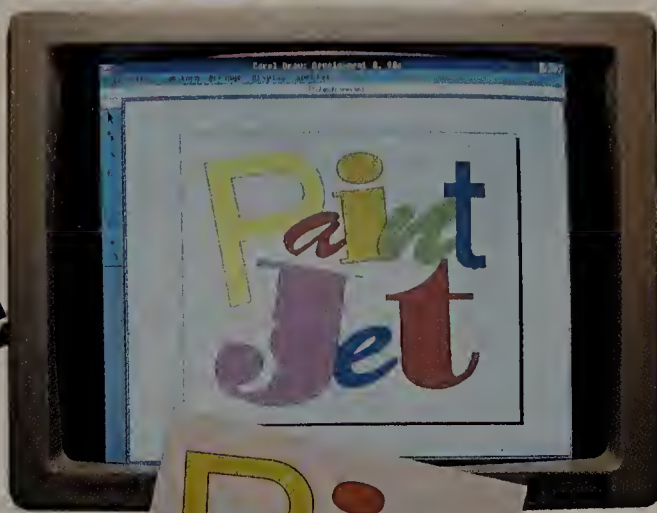
Download Fonts Once The LaserJet's cartridge and internal fonts are easy to use but limited to a few typefaces and sizes. Most *PageMaker* users seeking typographic flair soon turn to the wide array of attractive downloadable, or "soft," fonts sold on disk by HP, Bitstream, and other companies.

Before *PageMaker* prints a document that uses soft fonts, it naturally downloads the necessary fonts to the laser printer. Unfortunately, if you print the same document again during the session, *PageMaker* flushes the fonts out of the printer's memory and downloads them all over again.

Luckily, there is a way to download fonts just once. First, jot down the name and point size of the most frequently used

COREL DRAW!

DOES IT ALL



Superb Freehand Drawing & Incredible Text Control on ALL Popular Printers!

■ Easy, Powerful User Interface

- Microsoft Windows, running on all ATs and 386s, with 640k RAM
- Simplified menu & toolbox design
- Macros enable repetitive operations to be easily accessible
- Hundreds of useful samples & clipart
- Thorough documentation & tutorial

■ Lightning Speed

- Superior architecture results in amazing speed even with large drawings

■ Superb Freehand Drawing

- Draw Bezier curves quickly and easily
- Fast & Powerful curve editing

■ Calligraphic Pen Shapes

- Gives your curves a human touch by allowing custom pen shapes & angles

■ Powerful Bitmap Support

- Rotate, skew, stretch, scale, crop, color & position any bitmap

■ Autotrace to Quickly Create Artwork

- Automatically traces bitmaps, including scanned images to easily create your own editable artwork

■ Over 50 Precision Fonts In Any Size

- COREL's top quality typefaces (including 35 that match those in PostScript printers) are included for both screen & printer. You see EXACTLY what you get, even when your text is skewed, rotated, or magnified
- Laserjet, Paintjet, & Postscript printers are fully supported
- Easy typeface selection with font shapes visible during font selection
- Full international character set

■ Interactive Kerning

- Characters can be dragged until you see the exact spacing you want
- Individual characters can have different attributes within a text string including typeface, point size, angle etc.

■ Fit Text to a Curve

- Text can easily be snapped to any curve including circles, rectangles, or even other text

■ Fit Text to a Space

- Interactive letter, word and line spacing

■ Edit Lettershapes

- Start with any font you want, then create your own custom lettering

■ Special Effects for Postscript Printers

- Over 50 stunning textures including Fractal and Escher effects for filling any object
- Linear or radial fountain fills for any object including text
- Extensive halftone screening for all objects including bitmaps & text

■ Excellent Connectivity

- Import Lotus PIC, PCX, TIFF, Illustrator, GDF, CGM
- Export displayable EPS, Windows Metafile for use in page layout software
- Use with all Windows supported input and output devices including slidemakers, tablets, monitors, Videoshow etc.

■ Dazzling, Low Cost Color Output

- With CORELDRAW and a \$1395 Hewlett Packard Paintjet printer, you can create inexpensive but impressive color presentations
- Full PANTONE®* and CYMK color support for color separations and color matched output devices

■ Unlimited HOTLINE Support

- COREL experts are keen to help!



CORELDRAW!
ORDER NOW \$495**



COREL

COREL, 1600 Carling Ave. Ottawa, Ontario K1Z 8R7 (613) 728-8200

* Pantone Inc's check-standard trademark for color reproduction & color reproduction materials, **Available on 5.25" or 3.5" disks; Microsoft WINDOWS not included.

Circle 211 on reader service card


```

1 include xtpause
2 include xtchrdef
3
4 real rate, cost, surcharge, chan1
5 string info, month, day, year, xtime, xrate, xcost, usedtime, primetime
6
7 primetime = "no"
8 if speed < 1200 then rate = 6 else rate = 12.5
9 if curhour => 8 and curhour < 18 then primetime = "yes"
10 if weekday = 0 or weekday = 6 then primetime = "no"
11 if netid = "cis02" and primetime = "yes" then surcharge = 12 else surcharge = 2
12 if netid = "202202" and primetime = "yes" then surcharge = 12 else surcharge = 2
13 if netid = "CIS" or netid = "" then surcharge = .30
14 rate = rate + surcharge
15 cost = (rate * ontime)/36000
16
17 usedtime = hms(ontime,0)
18 month = str(curmonth)
19 day = str(curday)
20 year = str(curyear)
21 xtime = str(usedtime)
22 xrate = str(money(rate))
23 xcost = str(money(cost))
24
25 reply "OFF"
26 while online
27     watch for
28         "please log in" : wait 5 ticks : bye
29         "a" : wait 5 ticks : bye
30         "Host Name:" : wait 5 ticks : bye
31     endwatch
32 wend
33
34 pause "Cost of CompuServe time for this session", sp + xtime + sp + ...
35 "hours at" + sp + money(rate) + sp + "equals" + sp + money(cost) + cr + lf + ...
36 sp + "... Adding cost to file CISCOST.LOG" + cr + lf, "Press <Enter> to continue ..."
37
38 info = month + "/" + day + "/" + year + ":" + sp + xtime ...
39 + sp + "hours at" + sp + xrate + sp + "=" + sp + xcost
40
41 chan1 = freefile
42 open append "c:\xtalk\ciscost.log" as #chan1
43 write line #chan1, info
44 close #chan1
45
46 end

```

LISTING 1: OFFCOSTS.XTS. A Crosstalk MK.4 CASL script that calculates your on-line CompuServe costs.

typefaces in your document. Next, select Printer setup in the File menu, and click the Setup button. Select the Fonts button, and when the Soft Font Installer dialog box appears, pick the fonts you need from the list in the left window. Select the Permanent option, and a window appears reminding you that the font will become printer resident. Click OK, exit the Soft Font Installer, and then choose the downloading preference. You can direct *PageMaker* to download the fonts automatically just for that print session, or alter the system's AUTOEXEC.BAT

file so the fonts are installed whenever the PC boots up.

To make a "permanent" soft font temporary at the end of a session, return to the font list, highlight the font, and select Temporary.

Using these shortcuts speeds and simplifies common *PageMaker* operations considerably. For a summary of *PageMaker* keyboard and mouse tips, consult the "PageMaker Quick Reference Guide" at the back of your *PageMaker* reference manual. —Matt Lake



Communications

Track Compu-Serve Charges With Crosstalk MK.4

Use Crosstalk Mk.4's CASL script language to keep track of CompuServe costs.

What you need: Crosstalk Mk.4, a CompuServe subscription, and a modem

When Digital Communications Associates (DCA) introduced *Crosstalk Mk.4*, it replaced the script capability *Crosstalk XVI* users had known with a full-blown communications programming language called CASL. (Pronounced "castle," it stands for Crosstalk Application Script Language.) CASL is arguably the most sophisticated script language on the market.

CASL's structure and command set strongly resemble BASIC, with some touches of Pascal. Many CASL statements, such as GOTO, JUMP, GOSUB, and IF...THEN, will be familiar enough, but there are many new commands peculiar to communications, such as RECEIVE and UPLOAD. *Crosstalk XVI* script writers will recognize much of the new language, but nearly half the original commands have been altered, renamed, or dis-



TI's OmniLaserTM 2115. The network printer you need when your application needs are demanding.

The high-speed laser printer for shared-resource environments that can handle many people performing many tasks.

TI's OmniLaser 2115 printer provides the flexibility you need in multi-application environments. Especially where you have several different hardware systems attached to a network.

Built-in emulations mean an OmniLaser can satisfy the needs of virtually any application. It can produce desktop publishing output using the Adobe PostScript[®] page description language. It can emulate a dot-matrix printer for spreadsheets and draft text. Or an HP LaserJet[®] for word processing and business graphics. Even a plotter for

advanced graphics.

Best of all, with speeds of up to 15 pages per minute and a duty cycle of 25,000 pages per month, it can satisfy the needs of even the busiest group of professionals.

You can connect an OmniLaser to virtually any computer or network. It features multiple standard interfaces for IBM[®], DEC[®], Apple[®], even specialized hardware like CAD/CAM workstations.

Trouble-free paper handling.

The OmniLaser 2115 prints beautifully on a variety of paper stocks and sizes. Its two 250-sheet paper trays let you load stationery, letter- or legal-size paper, and select the size you need through its easy-to-use front control panel.

The right printers for right now, and in the future.

With the OmniLaser 2115, you have the flexibility you need for today's sophisticated printing applications. You also have the confidence of knowing that your OmniLaser offers a safe path to the applications of the future.

The OmniLaser family also includes the 2106 workstation printer and the 2108 small-cluster printer. So whatever the demand of your application, there's a multipurpose OmniLaser that's right for you.

To find out more, call Texas Instruments toll-free 1-800-527-3500.

carded. Fortunately, *Mk.4* includes a conversion script that translates *XVI* scripts to CASL. Though far from perfect, that script gives a head start to *XVI* users who make the move to *Mk.4*.

This article examines a script called OFFCOST.XTS (see **LISTING 1**). It logs you off a CompuServe session, calculates and displays the approximate connect charge, and stores the figure in a text file called CISCOST.LOG. The script is available on CompuServe's Crosstalk Forum, along with other CASL scripts and programming advice from DCA and other users. Type **go xtalk** and download the file from library 4.

If you type in **LISTING 1**, leave the line numbers off—they are for legibility only. The CASL script assumes that *Mk.4*, OFFCOST.XTS, and all included scripts are located in the XTALK directory on the C: drive. To run the script, simply type **do offcost** on the *Mk.4* command line, or assign the command to a function key.

The Fine Art of Stealing

Stealing is a time-honored programming technique, and CASL is an able partner in crime. OFFCOST's thieving ways become apparent in lines 1 and 2, which use the INCLUDE command to snatch two scripts supplied with *Mk.4*. The scripts contain procedures and variables that are used later in OFFCOST. Including other scripts not only minimizes typing but keeps programs short and compact.

In *Mk.4* each procedure performs a specific instruction. The procedure can include its own variables and accept arguments

that fill out the instruction. Procedures don't have to be in separate scripts, but keeping a collection of scripts that each contain a single procedure is a handy way to recycle code.

The first included script, XTPAUSE, contains a procedure that is used to display the session's cost in a window. The procedure (PAUSE) is not called until line 34. If you want to jazz up the window, you can modify the routine by adding CASL windowing commands that hide, move, and zoom windows and paint them in various colors.

The second pilfered script, XTCHRDEF, cuts down on coding drudgery. It defines abbreviated variables for the commands that format the window data in lines 34 through 39. For example, LF stands for linefeed, CR for carriage return, and SP for space.

Calculating Costs

After including the scripts, OFFCOST declares the numeric (line 4) and string (line 5) variables used to calculate and display the cost of the session. The variables' values are set in lines 7 through 23. Line 8, for example, calculates the billing rate based on transmission speed. Lines 9 and 10 determine whether you'll be charged prime/daytime rates or evening/weekend rates. Lines 11 through 13 add phone network surcharges. (If you don't have a CIS network surcharge, change .30 to 0.) Line 14 adds the rate and surcharge, and line 15 multiplies the resulting rate by the session length.

OFFCOST also relies on several of CASL's built-in variables. For example, in line 8, OFFCOST uses *Mk.4*'s ready-rolled SPEED function to determine the transmission speed. In line

17 the ONTIME variable keeps track of a session's length.

CASL also comes with functions that streamline coding. OFFCOST uses the MONEY function in lines 22 and 23 to insert dollar signs and decimal points. In lines 18 through 23, the STR function converts the numbers to text strings.

Now that the session cost has been calculated, it's time for action. Lines 25 through 32 log you off CompuServe. The WATCH FOR statement in line 27 waits for any of three prompts (Tymnet, Telenet, or CIS) that may signal a log-off, and then issues the BYE command.

WATCH FOR is a major improvement over *Crosstalk XVI*'s WAIT FOR, which looks for only one condition at a time. Among other benefits, WATCH FOR's ability to respond to several possible prompts allows it to react to glitches; for example, if line noise garbles a password the first time, WATCH FOR will respond if the password is requested again.

Once the connection is broken, OFFCOST finally calls on the two included scripts. Using the PAUSE procedure in XTPAUSE, OFFCOST opens a window in lines 34 through 39 and displays the variable contents along with some other text. Here's where XTCHRDEF's variable abbreviations pay off.

Lines 38 and 39 combine the numbers stored in the variables into a single variable (INFO) that can be easily saved to an ASCII file. Lines 42 to 44 open CISCOST.LOG, append the data from INFO, and save the file. Because *Mk.4* can read and write to several files at the same time, the FREEFILE variable in line 41 makes sure that data isn't

Get your work done before 1991.2

The future of personal computing is clear. More powerful PCs. Easier to use PCs. With graphics and character-based programs working side by side. Talking to each other. Multitasking. Windowing. Menuing. Mousing. Getting your work done easier and faster.

Have it all now.

DESQview™ is the operating environment that gives DOS the capabilities of OS/2.™ And it lets you, with your trusty 8088, 8086, 80286, or 80386 PC, leap to the productivity of the next generation. For not much money. And without throwing out your favorite software.

Add DESQview to your PC and it quickly finds your programs and lists them on menus. So you can just point to the program, using keyboard or mouse, to start it up. DESQview knows where that program lives. And what command loads it.

For those who have trouble remembering DOS commands, it adds menus to DOS. It even lets you sort your files and mark specific files to be copied, backed-up, or deleted—all without having to leave the program you're in.

Best of all, DESQview accomplishes all this with a substantial speed advantage over any alternative environment.

Multitask beyond 640K.

When you want to use several programs

For programmers, DESQview's API, with its strengths in inter-task communications and multitasking, brings a quick and easy way to adapt to the future. With the API's mailboxes and shared programs, programmers are able to design programs running on DOS with capabilities like those of OS/2.

together, you don't have to leave your current program. Just open the next program. View your programs in windows or full screen. Open more programs than you have memory for. And multitask them. In 640K. Or if you own a special EMS 4.0 or EEMS memory board, or a 386 PC, DESQview lets you break

through the DOS 640K barrier for multitasking. You can start 1-2-3 calculating and tell Paradox to print mailing labels while you're writing a report in Word Perfect, or laying out a newsletter in Ventura Publisher, or designing a building in AutoCAD.

DESQview even lets you transfer text, numbers, and fields of information between programs.

Fulfill the 386 promise.

For 80386 PC users, DESQview becomes a 386 control program when used in conjunction with Quarterdeck's Expanded Memory Manager (QEMM)-386—giving faster multitasking as well as virtual windowing support.

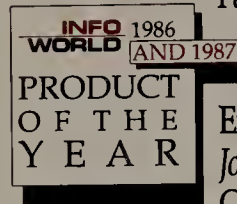
And when you use DESQview on an IBM PS/2™ Model 50 or 60 with QEMM-50/60 and the IBM Memory Expansion Option, DESQview gives you multitasking beyond 640K.

Experts are voting for DESQview. And over a million users, too.

If all of this sounds like promises you've been hearing for future systems, then you can understand why over a million users have chosen DESQview. And why PC



Magazine gave DESQview its Editor's Choice Award for "The Best Alternative to OS/2," why readers of *InfoWorld* twice voted DESQview "Product of the Year" why, by popular vote at Comdex



Fall for the last two years in a row, DESQview was selected as "Best PC Environment" in *PC Tech Journal's* Systems Builder Contest.

DESQview lets you have it all now.

DESQVIEW SYSTEM REQUIREMENTS:

IBM Personal Computer and 100% compatibles (with 8086, 8088, 80286, or 80386 processors) with monochrome or color display; IBM Personal System/2 • Memory: 640K recommended; for DESQview itself 0-145K • Expanded Memory (Optional): expanded memory boards compatible with the Intel AboveBoard; enhanced expanded memory boards compatible with the AST RAMpage; EMS 4.0 expanded memory boards • Disk: two diskette drives or one diskette drive and a hard disk • Graphics Card (Optional): Hercules, IBM Color/Graphics (CGA), IBM Enhanced Graphics (EGA), IBM Personal System/2 Advanced Graphics (VGA) • Mouse (Optional): Mouse Systems, Microsoft and compatibles • Modem for Auto-Dialer (Optional): Hayes or compatible • Operating System: PC-DOS 2.0-3.3; MS-DOS 2.0-3.2 • Software: Most PC-DOS and MS-DOS application programs; programs specific to Microsoft Windows 1.03-2.03, GEM 1.1-3.0, IBM TopView 1.1 • Media: DESQview 2.0 is available on either 5-1/4" or 3-1/2" floppy diskette.

YES!

I need increased productivity now!

Name _____

Address _____

City _____

State _____

Zip _____

Payment Method ☐ Visa ☐ MasterCard Expiration ____/____

Account # _____

Qty	Product	Format	Price Each	Totals
	DESQview 2.0	☐ 5-1/4 ☐ 3-1/2	\$129.95	
	QEMM-386	☐ 5-1/4 ☐ 3-1/2	\$59.95	
	QEMM-50/60	☐ 5-1/4 ☐ 3-1/2	\$59.95	

Shipping & Handling \$5 in USA/ \$10 outside USA

Calif Residents add 6.5%

Grand Total _____

Quarterdeck

150 Pico Boulevard, Santa Monica, CA 90405
(213) 392-9851

Trademarks are property of their respective holders: IBM, OS/2, PS/2, 1-2-3, Paradox, Word Perfect, Ventura Publisher, AutoCAD, Intel, Above Board, AST, RAMpage, Advantage, Hercules, Mouse Systems, Hayes, Microsoft, Windows, TopView.

Circle 159 on reader service card

written to another open file.

This article offers just a glimpse of the full power of CASL. You could modify OFF-COST.XTS to account for the lower rates charged on holidays, the additional surcharges tacked on by special services, and the free time you receive while uploading files. The more you explore CASL, the more elaborate—and useful—your scripts will become. —Ron White

Richard Scoville is a contributing editor for PC World. Matt Lake is PC World's Andrew Fluegelman editorial intern. Ron White is a news editor for the San Antonio Light and founder of the IBM Compatible Users Group.

USER GROUP TIPS

Helpful hints from members of the nation's user groups

Scrolling Page-by-Page in DOS

When you read a long ASCII file (such as a READ.ME file) by using the TYPE command at the DOS prompt, you can press <Ctrl>-S to start and stop document scrolling. But there's a better way—a batch file that uses DOS's MORE command to pause scrolling after each screen and then lets you resume scrolling by pressing any key.

First check to see whether your version of DOS has MORE.COM. A copy of MORE.COM must be in the default drive or, preferably, in a directory in the

system's path. If so, enter **COPY CON READ.BAT** at the DOS prompt, and then type

ECHO OFF <Enter>

MORE < %1 <Enter>

Press <F6> and <Enter> to copy READ.BAT into the current directory. Then move READ.BAT to a directory (for example, \BATCH) that is listed in the system's path. Now, whenever you want to read an ASCII file, simply type READ and then the file name, for example, **READ \CONFIG.SYS**.

*Scott A. Whitney
Orange Coast PCUG*

Run WordPerfect in RAM

WordPerfect uses temporary files to store part of your document if it doesn't fit in available RAM and also for functions such as checking spelling. You can speed up the program by putting such temporary files on a RAM drive. To do this, add the /D switch to the DOS command line when you load the program. For example, if drive E: is your RAM drive, enter WP/D-E:. Remember, when working with a RAM disk, you should save your file frequently to a hard disk or a floppy.

You can also load the entire program into RAM if your PC has at least 384K of RAM available. Load the entire program by issuing WP/R, or combine both these speedup tips by using WP/D-E:/R.

*Bill Weil, Vendor Coordinator
San Francisco PC Users Group*

ASCII to WordPerfect Made Easy

Reading ASCII files with WordPerfect 5.0 produces unwanted hyphens and ill-placed line breaks when lines in the ASCII file don't fit between WordPer-

fect's margins. Here's a WordPerfect macro that creates a template with wide margins and turns off hyphenation to produce uncluttered ASCII files.

Press <Ctrl>-<F10> to start recording the macro, name it, then press <F7> NN to clear the screen without exiting WordPerfect. Next press <Shift>-<F8> LJN to display the Print Format menu and turn off right justification. Press <Enter> twice to exit the menu, then <Shift>-<F8> LM0 <Enter> 0 <Enter> to display the Line Format menu and set wide margins. Press <Enter> twice to return to the document.

Next, press <Shift>-<F8> LYN to switch off hyphenation, and press <Enter> twice to get back to the document. Press <Ctrl>-<F5> 13 to display the Document Conversion menu, type in the ASCII file name, and press <Enter>.

Finally, press <F1>-<Ctrl>-<F10> to exit the Document Conversion menu and finish recording the macro.

After using the macro and editing your document, you can restore normal margin and hyphenation settings by pressing <Home><Home><Cursor Up><Home><Cursor Left> and then pressing <Backspace> twice to delete the template format codes.

*Debee Norling
San Francisco PC Users
Group*

Chip in! If you're a member of a user group and have tips to share, send them to PC World. We pay \$25 for each published tip. Or if you have a business problem that requires a PC solution, get in touch with our experts. See How to Contact PC World, page 4. ●

From creation

To completion...

PVI PURCHASE ORDER

VENDOR # 107 DATE 11-10-8x ORDER # 301 T TAXABLE ☒ NONTAXABLE ☐ PLEASE SEE COMPLETE TERMS OF PURCHASE AGREEMENT ON BACK

Vendor: Best Furnishings 123 Northern Blvd. North Hills, CA 90001

Ship to: Pacific Vacations, Inc. South Beach Branch 101 Cove Road South Beach, CA 90000 Attn: Andrew (x3337)

PAYMENT TERMS Net 30 REQUIRED BY ASAP FOB North Hills, CA PARTIAL SHIPMENT ☐ ALLOWED ☒ NOT ALLOWED

This order is to be entered in accordance with prices, delivery and specifications shown. Please notify us immediately if you are unable to ship as specified.

Item	Qty	Description	Price	Amount
1	1	Conference table, model F-17	1500.00	1500.00
2	8	Chairs, model CC-55	200.00	1600.00
3	1	4' by 6' blackboard	700.00	700.00

Total Purchase Amount 3800.00

Special Instructions or Remarks: Bill To address same as Ship To address. Note: Please be careful with color match of chairs. Above quoted prices were confirmed on Oct 1st by Joan and sales manager. Deliver to 3rd floor after checking in with shipping/receiving dept. call Andrew before delivery.

AUTHORIZED BY [Signature] DATE 11/10/88

This form created using FormWorx with Fill & File. FormWorx Corporation, 1801 Trapelo Road, Waltham, MA 02154 Telephone 617-260-4490 Fax 617-890-4498

Easily mix multiple type styles and sizes.

Versatile line spacing (6, 8 or 12 lpi, or any odd spacing you wish to preset).

Wide or narrow lines, check boxes and other symbols.

Lookup tables automatically enter data so you don't have to.

Read existing dBASE files directly, or create new ones with up to 255 data fields per form.

Descriptions up to 4,000 characters can be stored as data fields.

No other forms program does so much. So well.

Creation.

Make any form quickly and easily using **FormWorx with Fill & File.**™ Right on your own PC. No need for costly expenses and delays. Use large type for unmistakable headings, small type for inconspicuous labels. Proportionally spaced fonts or fixed-spaced type. Take full advantage of features on supported printers. Lines print perfectly straight and solid on dot matrix and laser printers. The result—business forms that truly look business-like.

Completion.

Easily fill out forms right on screen and get letter-perfect results. Form after form. Simply tab from blank to blank and type in your data, or merge

data from existing dBASE or ASCII files. Entries go exactly where they belong. No overwrites. No misalignments. No "white-out."

Print data onto standard forms you already have in stock. Or form and data onto blank paper. Search and locate desired forms and automatically batch print them. Capture data the first time a form is filled out and store it in dBASE or ASCII format. Retrieve and edit data just as easily.

Solution.

The program does math, too. So it all adds up. **FormWorx with Fill & File** is the most comprehensive forms processing software available today. It's a **complete solution that's easy**

to use. Start from scratch or modify one of the many forms already made. Changing a form really is as easy as changing your mind.

For just **\$149** you get the complete package including 70 sample forms, exceptional manuals, pop up calendar and calculator, and **FREE** telephone support.

So see your dealer today. Or order directly for fast delivery.
800-992-0085 or 617-890-4499

FormWorx
CORPORATION

Reservoir Place, 1601 Trapelo Road, Waltham, MA 02154

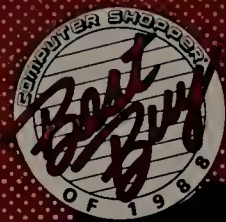
Forms shown were printed using version 2.5 on an HP LaserJet II with downloaded fonts. Digitized logo printed within FormWorx by invoking a printer macro. Some features shown not available on all printers. **45-day money back guarantee on direct purchases.** When ordering by mail, include \$6.75 for shipping in U.S. and Canada. Air mail overseas—\$18. In Massachusetts add 5% sales tax. Purchase orders accepted from government agencies, institutions, and rated corporations. FormWorx with Fill & File is a trademark of FormWorx Corporation. dBASE is a registered trademark of Ashton-Tate.

Circle 345 on reader service card

TELEMARK

1-800-634-9270

Doing Business Since 1983 • A Division of CW Marketing, Inc.



**The Acknowledged Leader
in the Computer Mail Order Industry**
Call About The Availability of Other Products and Prices



FREE

AIR EXPRESS SHIPPING
You Pay The Ground Shipping
We Pay The Air Difference



PC/XT SYSTEM

10MHz, 640K Memory, 150 Watt Power Supply, AT Style Keyboard,
1-360K Drive, AT-Style Case, Monographics Card with Parallel Printer
Port, Clock Card with Serial Port, Mono Monitor with Swivel Tilt Base

\$709

System w/2-360K Drives \$787

System w/1-360K DR 1-20 Meg ... \$994
System w/1-360K DR 1-30 Meg ... \$1021

IBM SOFTWARE

WORD PROCESSORS

Easy Extra	\$53
Grandview	155
Multimate Advantage II	264
PFS: Professional Write	102
Volkswriter 3	132
Volkswriter Deluxe Plus	57
Word (Microsoft)	189
Word Perfect 4.2	198
Word Perfect 5.0	219
Word Perfect Executive	117
Word Perfect Library	58
Wordstar Pro Pack	235
Wordstar 2000 Plus 3.0	199

DISKETTES

Maxell	Call
Sony 5 1/4 Qty. 100 DS/DD	\$65
Sony 3 1/2 Qty. 100 DD	165
Sony 3 1/2 HD Qty. 100	379

DESKTOP PUBLISHING

Pagemaker 3.0	\$459
PFS: First Publisher	69
Ventura Publishing	445

LANGUAGES

Basic Compiler (MS)	\$176
C Compiler (MS)	269
Cobol Compiler (MS)	538
Fortran Compiler (MS) 4.1	269
Macro Assembler (MS)	89
Pascal Compiler (MS)	179
Quick Basic	59
Quick C	59
Turbo Basic	62
Turbo C	88
Turbo Pascal 5.0	88
Turbo Pascal Dev. Library	228

GRAPHICS

Designer	\$399
Draw Plus	229
Generic CAD w/Dot Plot 3.0	72
Harvard Graphics 2.1	255
In-A-Vision	262
Microsoft Chart 3.0	236
News Room	30
Printmaster Plus	28
PrintShop	32
Turbo Graphix Tool Box	58
VP Graphix	56

UTILITIES

Brooklyn Bridge	\$66
Copy II PC	18
Cruise Control	28
Disk Optimizer 4.0	37
Disk Technician Plus	67
Fastback Plus	98
Mace Utilities	47
Microsoft Windows 286	59
Microsoft Windows 386	116
Norton Utilities 4.0	47
Sidekick Plus	125
Sideways	37
SQZ Plus	53
Take Two MGR	65
XTree Professional	61

DATA BASE MANAGEMENT

Clipper	\$405
DB-XL Diamond	107
Nutshell Plus	185
Paradox 2.0	403
PFS: Professional File 2.0	152
Q & A	185
R:Base For DOS	425

MONEY MANAGEMENT

Dollars & Sense w/Forecast	\$91
Tobias Manag. Your Money 5.0	114

COMMUNICATIONS

Carbon Copy Plus	\$106
CompuServe Subscription Kit	19
Crosstalk XVI	87
Crosstalk Mark IV	109
Mirror II	33
Remote II	87
Smartcom II	79
Smartcom III	136

INTEGRATIVE SOFTWARE

Ability Plus	\$137
Enable 2.0	369
Framework III	409
MS Works	85
PFS: 1st Choice	82
Smart Software System	385
Symphony	409

MICE

PC Mouse w/paint (Buss or Serial)	\$82
PC Mouse	
w/Autosketch Buss	97
w/Autosketch Serial	97
Microsoft Buss Mouse 1.0	95
Microsoft Serial Mouse 1.0	95
MS Buss Mouse w/CADD	110
MS Buss Mouse w/Windows	126
MS Serial Mouse w/CADD	110
MS Serial Mouse w/Windows	126

SPREADSHEET

Camt	\$80
Lotus 1-2-3 Ver. 2.01	285
Lotus Manuscript	289
MS Excel	219
MS Excel/Mach 20 Bundle	641
Multiplan 4.0 Microsoft	116
Quattro	146
Supercalc 4	299
VP Planner	47
VP Planner Plus	112

IBM HARDWARE

PRINTERS

ALPS	
Allegro	\$345
All Other Models	Call
AST Turbo Lazer	3865
Citizen Printers	
120D	149
180D	165
All Other Models	Call
Diconix	
150	309
300	485
Epson	
FX850	355
LQ850	555
LQ500	289
All Other Models	Call
Hewlett-Packard	
Laser Jet Series II	1785
Paint Jet	1085
NEC	
P2200	339
P5200	505
Other Models	Call
Okidata	
320	Call
321	Call
390	Call
Lazerline 6	1325
New Lasers	Call
All Other Models	Call

Panasonic	
1080 I M2	159
1091 I M2	179
1124	319
All Other Models	Call
Star Micronics	
NX 1000	169
NX 1000 Rainbow	225
All Other Models	Call
Toshiba	
311	385
321 SL	489
351 SX	979
Pagelazer	2559

MODEMS

Anchor	
1200 Ext	\$85
1200B w/Software	60
2400B w/Software	115
Hayes	
All Models	Call
Prometheus	
1200B w/Software	70
2400B w/Software	125
Other Models	Call
US Robotics	
Courier 2400	255
Courier 2400E	310

HAND SCANNERS

Complete	
400	\$139
Half Page	139

DISK DRIVES

Bernoulli Box	
10 Meg	\$889
20 Meg	1250
Beta Int 20 Meg	765
Headcards	
Plus 20 MG Hardcard	509
Plus 40 MG Hardcard	645
Magnum Tape Back Up	
44 MG Ext	460
44 MG Internal	340
Seagate	
20 MG w/WD Controller	270
251-1 40 Meg AT	435
40 MG w/Controller	439
All Other Models	Call
Teac	
1.2 MG AT	85
Floppy 360K	70
Toshiba	
3.5 Dr 720K	89
3.5 Dr 1.4 MG	99

KEYBOARDS

Keytronics	
KB101 +	\$85
KB5151	119

Wyse	
30	\$295
50	370

TERMINALS

BOARDS

AST	
Hot Shot	\$350
Six Pack Plus w/384K	269
All Other Models	Call
ATI	
EGA Wonder	225
VIP VGA	220
Hercules	
Graphics Card Plus	175
All Other Models	Call
Intel	
Inboard 386 PC	720
Co-processors	Call
Orchid	
Designer 800	239
Pro Designer	299
Tiny Turbo 286	259
Paradise	
Autoswitch 350	155
Autoswitch 480	170
All Other Models	Call
Video-7	
Fastwrite VGA	355
VGA	265
Vega deluxe	205
Zenith	
449	239

FAX BOARDS

Complete	
4800	\$225
9600	389

COMPUTERS

AST	
Model 80	\$1440
Other Models	Call
NEC	
Multispeed EL II	1479
Multispeed HD	2299
Toshiba	
T-1000	809
T-1200FB	1569
T-1200HB	2405
T-3200	3665
T-5100	4795
Zenith	
Supersport/2	1655

MONITORS

Amdek Monitors	
210A	\$80
410	130
432	149
Mitsubishi	
Diamond Scan 14"	499
NEC	
Multisync II	589
Multisync Plus	899
Other Models	Call
Princeton	
Ultrasync	485
Other Models	Call
Sony	
Multiscan (1303)	535
Zenith	
1490	599



• No Charge for VISA and Mastercard.
• We Do Not Charge Your Card Until Your Order is Shipped.
• All products including D.O.A.'s, carry only manufacturer's warranties. We do not honor guarantees, rebates, trial period privileges or promotional programs offered by manufacturers.
• No returns on used or misordered product.
• You Pay The Ground Shipping 1-10# \$6.00; 11-20# \$10.00 (Except Alaska & Hawaii). We Pay the Air Difference.

• Free Air Applies ONLY to Orders Over \$100.
• No APO, FPO, or international orders please.
• Call Before Submitting P.O.'s. Ask for National Accounts.
• Personal and Company Checks Will Delay Shipping 3 Weeks.
• Prices, Terms & Availability Subject to Change Without Notice.
• Add 5% for C.O.D. Orders.
• We Do Not Guarantee Machine Compatibility.
• Mailing Address: TELEMART, 8804 N. 23rd Ave., Phoenix, AZ 85021.

• To Place an Order: 1-800-634-9270.
• To Follow Up On An Order: (602) 944-1037.
• Order Line Hours:
Mon.-Fri. 7:00 am-6:00 pm
Saturday 9:00 a.m.-1:00 p.m.
• Order Processing: (602) 944-1037
10:00 a.m.-3:00 p.m. Mon.-Fri.



CONSUMER WATCH

Advice and information for the computer consumer

Are you shopping for a computer or peripheral? Watch out—some manufacturers use phony FCC ID numbers and ship unshielded hardware.

Anita
Amirrezvani

It's a beautiful spring day, and you're sitting near an open window, working on your new computer. The radio on your desk is playing classical music—but the reception is unusually poor. A taxicab pulls up right in front of the window; you hear the cabbie communicating with the dispatcher. Suddenly, with no warning, your computer reboots.

What's the connection between these incidents? According to experts at the Federal Communications Commission (FCC), improperly shielded PCs can interfere with other electronic devices like radios or TVs and can be affected themselves by transmissions from taxis, police, and emergency services.

By law, every PC must be shielded to limit its radio frequency (RF) emissions. The FCC, which describes its mission as "protecting the electromagnetic spectrum," requires manufacturers to build computers to one of two specifications: Class A or Class B.

Class A regulations affect computers intended for commercial or industrial use only. Class B shielding requirements are much more stringent because they cover PCs that may also be used at home, where they could interfere with radio or television reception. According to the FCC, Class B radiation limits for computers "are designed to protect a TV receiver located 10 meters away with at least one wall between the [computing] device and the receiver."

ANTHONY RUSSO

J. Jerry Freeman, FCC coordinator for computer marketing enforcement in Norfolk, Virginia, says that all computers sold through the mail or through consumer retail outlets should be certified Class B. "I have yet to see an 8088 or an 80286 that someone could reasonably argue should only get Class A," says Freeman. "A machine like a tower 386, which is really intended only for business use, might qualify as just a Class A device."

Nevertheless, Freeman estimates that Class B regulations have only a two-thirds compliance rate. Every machine that passes Class B standards must be plainly labeled as a Class B device and display an FCC ID number, but Freeman says some manufacturers, "mostly offshore," just make up phony ID numbers. Some computers are brazenly sold without any ID number at all, probably in the hope that the consumer won't know to look for it.

Even major manufacturers have sometimes illegally sold PCs while FCC certification is in process. "Until a unit is certified, it may be displayed at trade shows such as COMDEX, but no orders may be taken," says Freeman. That's because FCC tests may require changes to the manufacturer's existing design. To ensure compliance, the FCC hires undercover investigators
(continues)

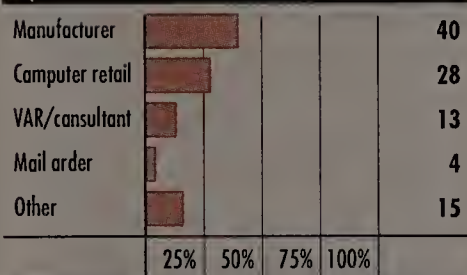
RATE YOUR SATISFACTION: Buying PCs

How you buy depends on who you are. In this International Data Corporation survey of large organizations, 40 percent say they buy PCs directly from the manufacturer. And it's no wonder—far big accounts, manufacturers offer magnanimous discounts and service with a smile.

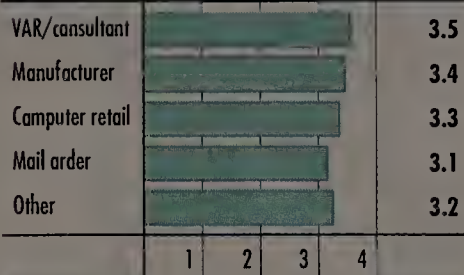
Survey participants say they're fairly well satisfied with buying computers from manufacturers' direct sales forces, but consultants rate even higher.

When asked what factors they consider before buying a PC, surveyed companies put quality and price at the top of their list. But other issues, such as dealer recommendation and support, also made a strong showing.

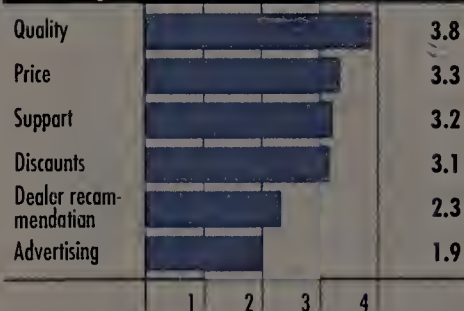
Where users buy PCs in percent



Users rate their satisfaction 1=low 4=high



What's important to PC buyers? 1=low 4=high



Source: International Data Corporation. From a survey conducted in June 1988 of 191 sites, each with at least 50 PCs.

who try to order uncertified units at shows like COMDEX. If they're successful, the manufacturer may be subject to a \$2000 fine.

Given the penalties, why do manufacturers fail to comply? For a simple reason: Getting Class B certification requires extra time and money. The PC has to be carefully designed from the ground up to prevent emissions. Then the manufacturer usually pays an independent testing lab to find out whether the computer meets the requirements. If it doesn't, it has to be redesigned and retested.

When the PC passes the lab tests, both the computer and the lab report must be submitted to the FCC, which performs its own tests. If the PC surmounts this hurdle, it's granted Class B certification, and the FCC requires the manufacturer to freeze the design. All peripherals—keyboards, printers, modems, accelerator boards—must be tested and certified as well. If the peripheral is sold separately from the computer, it must have its own FCC ID number.

According to experts, the faster the microprocessor, the more difficult it is to shield the computer. "When you speed up the PC's clock, the wavelengths of the frequency become shorter and shorter," says Chuck Kendall, director of labs for CK Consultants, a testing lab in Mariposa, California. "Those smaller wavelengths can creep out more easily, especially in AT-type boxes that were designed for a much slower microprocessor."

Because of their speed, it's particularly difficult for 80386s to pass, and not all manufacturers have the technical know-how to shield them properly. "Some

people just piece computers together like erector sets," says Kendall. "It's hard on the consumer because all the boxes look alike."

Fortunately, there *are* ways to make sure a computer has been certified Class B. If there's no FCC ID number on a computer or separate peripheral that's being sold to both business and home markets, you should be suspicious. If there *is* a number but you don't feel particularly confident about the manufacturer, you can call one of the 36 FCC offices and ask someone there to verify that the ID number is valid.

The FCC also offers a bulletin board called PAL that allows consumers to check FCC ID numbers. Just dial 301/725-1072 with your modem, and type in the number. The system will let you know if and when the computer actually got the FCC stamp of approval.

If you accidentally end up with a Class A machine, it's not necessarily a tragedy. But be forewarned that correcting any interference problems will be up to you.

SHOP TALK

Say Goodbye to Your Data

I have been an owner and avid user of *Dollars and Sense* since 1985. I rely on it for all my personal bookkeeping, tax planning, and portfolio management.

I was terribly disappointed when I determined that version 3.0 has a fatal glitch. What happened was I couldn't get the Forecast module to work properly, the part of the program that
(continues)

Introducing...

MIRROR III

Full Spectrum Data Communications

From the occasional user to the experienced professional, today's PC communications software needs to cover the full spectrum.

Pre-programmed access to most popular dial-up information services • "Learn" mode to create your own log-on sequences • Dialing Directory • Installation and System Diagnostics • Comprehensive "HELP" system • 100% Crosstalk® XVI compatibility.

Background mode: Start a file transfer and switch to running another program while MIRROR III handles the transfer behind the scene.

Ultra High-Speed modem support (19,200 bps), or direct connect (up to 115,200 bps).

Host system connectivity with terminal emulations including DEC VT 100/220 series, IBM 3101 (with block mode), Televideo 925, and Wyse-50.

File transfer protocols: XMODEM, YMODEM, KERMIT, Crosstalk, Hayes, CompuServe-B and ACT CommPressor™ (the latest in data compression).

PRISM: Introducing the most powerful data communications programming language. PRISM provides: Form/Menu generation; real, integer, string, and array variables; File I/O and the ability to integrate MIRROR III with foreground applications. A script file protection/compression utility is also provided.

Put the power of "Full Spectrum Data Communications" to work for you.
Order MIRROR III Today!

To order, Call: 1-800-634-8670
60-Day Money-back Guarantee

\$99.95



VISA/MasterCard/COD: \$5.00 for Shipping and Handling (\$8.00 for COD orders)
Florida residents add 6% sales tax.

MIRROR III is for use on IBM and 100% compatibles (including the IBM PS/2) running MS-DOS 2.0 or higher.

Crosstalk is a registered trademark of DCA, Inc./CommPressor™ is a trademark of ACT, Inc.

DISTRIBUTING CORP.
327 Office Plaza Drive
Tallahassee, Florida 32301
Telephone: (904) 878-8564
Telex: 6714280 KLON

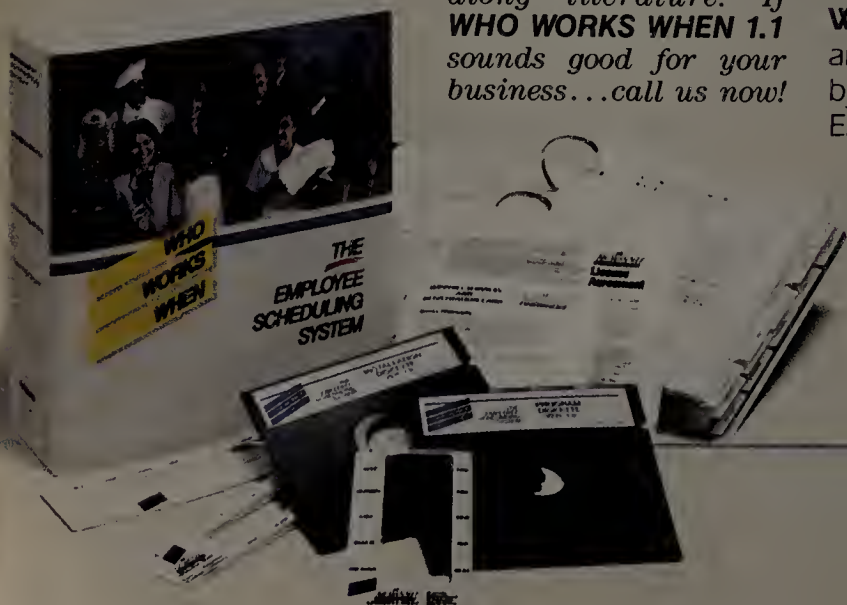
Circle 236 on reader service card



WHO WORKS WHEN

V.1.1

Our new version comes with work patterns and improved reports to make scheduling even faster and easier. **WHO WORKS WHEN 1.1** is ideal for any multiple shift business like: hospitals, hotels, restaurants, law enforcement, retail, manufacturing, or transportation. If you know someone that would be interested, circle our readership service number and we'll send you pass-along literature. If **WHO WORKS WHEN 1.1** sounds good for your business...call us now!



SOFTWARE THAT SCHEDULES EVERY EMPLOYEE IN SECONDS!

WHO WORKS WHEN 1.1 schedules your employees for every department, station, shift, and job code. Schedule up to 200 employees per user-defined group with an unlimited number of groups possible. Create rotation patterns with shift and station assignments as needed. Schedules can be made up to six weeks or longer. Easy-to-use screens for precise setup, accurate schedule, and quick editing. No complicated formulas to remember. **WHO WORKS WHEN 1.1** calculates in seconds-prints in minutes.

Up to the minute reporting. **WHO WORKS WHEN 1.1** generates and prints the reports most asked for by managers. Staff Schedule by Employee, Master Schedule by Shift and Station, and Individual Employee Schedule, are just a few of the schedule printouts available. Other valuable reports on facility, department, and employee infor-

mation are designed to help you keep accurate records.

Requirements: 640K RAM, hard disk drive, MS-DOS 3.0 or higher. IBM PC PC/AT, PC/XT, PS/2 or compatible.

Take the rest of the day off! You'll save days of manual scheduling. You don't have to remember or juggle each employees' work schedule.

WHO WORKS WHEN 1.1 does it all for you! It comes with online help, step-by-step tutorial, and documentation for easy learning. Optional installation and operating support available.

WHO WORKS WHEN 1.1 is priced at \$479 per copy plus \$7.50 S&H. Comes complete with a 30 day money back guarantee. VISA/MC, company P.O.'s and checks accepted. Call toll free to order. **FREE** demo diskette also available.

OR CALL TOLL FREE

1-800-782-1233

NEWPORT
SYSTEMS

P.O. Box 3705
Bellevue, WA 98009, U.S.A.

Circle 9 on reader service card

IBM and PS/2 are registered
trademarks of IBM Corporation

computes and projects tax liability. I called Monogram's technical support department and was told that entering the Forecast module had "irretrievably corrupted" my data. Because I had attempted the same procedure on my backup file, it too was corrupted. Nonetheless, Monogram's "upper management" had decided not to notify its customers.

I was incensed. I've had to spend literally weeks reconstructing and reentering the data for 1988.

*Laurence J. Kline
Chicago, Illinois*

Monogram Computing responds: I am new to Monogram, having joined as its CEO in September 1988. I was disturbed to

hear of Mr. Kline's difficulty. Since learning about that problem I have ascertained that it occurs only under these circumstances: when using MS-DOS 3.0 or 3.1, the Extend Year function, and the Forecast module.

Our software engineers have worked diligently on this problem ever since users reported it in January 1988, and we had planned to notify our customers through our newsletter. Due to personnel changes in our marketing department, however, the newsletter was not published.

As soon as a solution to the problem is available, it will be provided without charge to all registered users who request it. The problem and the offer will also be described in our next newsletter.

*David A. Brewer
Chief Executive Officer*

Editor's note: Clearly, this is a situation where users should have been notified immediately. Since they weren't, the least the company could do would be to provide the fix free of charge to all registered users, whether or not they request it.

Paying for a Monitor Twice

My Princeton HX-12 monitor has failed four times in three-and-a-half years. The symptoms are a squealing noise followed by a black, inactive screen.

The first failure happened 13 months after purchase, just 1 month beyond the one-year warranty, so I had the monitor repaired by Sorbus. The second failure occurred 12 months later; repairs were performed by a small local shop. The third failure came only 5 months later. I

(continues)

**Q. What is Faster than VGA,
Cheaper than CGA,
Sharper than EGA...**

Swan 286/10

Swan XT10

Swan 386/20T

Swan Technologies

LOVE 'EM or LEAVE 'EM!

30 DAY MONEY BACK GUARANTEE

It's obvious our prices are lovable. But we make this guarantee because we know you'll also love our...

- Quality Products
- Toll Free Technical Support
- Toll Free Customer Service
- Same Day Shipping
- 1 Yr. Warranty on Parts & Labor

CALL TOLL FREE **1-800-468-9044**

Swan 386/16



386/16	VIDEO OPTIONS Include Monitor & Video Adapter			
Drive Options	Mono	14" Flat Mono	VGA Mono	VGA Color
w/40MB (40ms) Hard Drive	\$2549	\$2598	\$2748	\$3048
w/80MB (28ms) Hard Drive	\$2849	\$2898	\$3048	\$3348
w/150MB (17ms) ESDI w/1:1 Interleave	\$3594	\$3643	\$3793	\$4093

Swan XT10

\$549

Monitor not included

Base System with Single 360K Drive, Assembled & Tested IBM® XT Compatible

XT10	VIDEO OPTIONS Include Monitor & Video Adapter			
Drive Options	Mono†	CGA	EGA	VGA
Single Floppy	\$699	\$869	\$1098	\$1198
Dual Floppies	\$779	\$949	\$1178	\$1278
*w/20MB (65ms) Hard Drive	\$979	\$1149	\$1378	\$1478
*w/32MB (40ms) Hard Drive	\$979	\$1149	\$1378	\$1478

* Includes Single 360K Floppy Drive

† Upgrade from 12" to 14" Flat Screen, add \$49

NOW AVAILABLE!

On-Site Service from

SorbusSMA Bell AtlanticTM Company

Call for Details

Swan Modems

w/ PC Talk III software

■ Hayes® compatible ■ Auto answer/dial	
* 2400 baud internal	\$129
1200 baud internal	\$69
2400 baud external	\$149
1200 baud external	\$99

* Includes Bit Com v 3.5 software

Swan Tape Backups

■ QIC-40 operating standard ■ Network compatible	
40MB XT or AT Internal	\$299
40MB XT or AT External	\$399

ALL SWAN PRODUCTS CARRY A
FULL 1YR. WARRANTY

Swan 286/10

\$999

Monitor not included

Base System with 1.2MB Drive, Assembled & Tested IBM® AT Compatible MS-DOS®, OS/2® Compatible

286/10	VIDEO OPTIONS Include Monitor & Video Adapter			
Drive Options	Mono†	CGA	EGA	VGA
w/20MB (65ms) Hard Drive	\$1399	\$1569	\$1798	\$1898
w/40MB (40ms) Hard Drive	\$1549	\$1719	\$1948	\$2048
w/80MB (28ms) Hard Drive	\$1849	\$2019	\$2248	\$2348

† Upgrade from 12" to 14" Flat Screen, add \$49

Swan 286/12

\$1099

Monitor not included

Base System with 1.2MB Drive, Assembled & Tested IBM® AT Compatible MS-DOS® OS/2® Compatible

286/12	VIDEO OPTIONS Include Monitor & Video Adapter			
Drive Options	Mono	14" Flat Mono	EGA	VGA
w/40MB (40ms) Hard Drive	\$1649	\$1698	\$2048	\$2148
w/80MB (28ms) Hard Drive	\$1949	\$1998	\$2348	\$2448

XT, AT and OS/2 are registered trademarks of
International Business Machines

MS-DOS is a registered trademark of Microsoft Corporation

Standard Features	XT10	286/10	286/12	386/16	386/20D
CPU	8088-1	80286	80286	80386	80386
Speed (MHz)	10/4.77	10/6	12/6	16/8	20/8
BIOS	Phoenix	Phoenix	Phoenix	Phoenix	Phoenix
Norton SI Rating v 4.0	2.1	11.2	13.7	17.6	22.0
Wait State	0	0	0	0	0
Standard Memory	640K	512K	512K	1MB	1MB
Shadow BIOS	—	—	—	384K	384K
Memory Upgrades	—	640K/1MB	1MB	2/4/8/10/16MB	2/4/8/10/16MB
Coprocessor Support	8087	80287	80287	80287 or 80387	80287 or 80387
Expansion Slots: 32-bit	—	—	—	1	1
Expansion Slots: 16-bit	—	6	6	4	4
Expansion Slots: 8-bit	8	2	2	3	3
Dual HD/FD Controller	w/H.D. systems	Yes	Yes	Yes	Yes
Device Bays (Exposed/Internal)	2 Exp./2 Int.	3 Exp./2 Int.	3 Exp./2 Int.	3 Exp./2 Int.	3 Exp./2 Int.
Serial Ports	1	1	1	1	2
Additional I/O Ports	All come with 1 Parallel and 1 Game Port				
Power Supply	150W	200W	200W	200W	200W
Keyboard	101 Key	101 Key	101 Key	101 Key	101 Key
Additional Features	All come with Clock Calendar w/Battery Backup and Setup/Utilities Disk				
OPTIONS:	XT10	286/10	286/12	386/16	386/20D
3.5" Floppy Drive	Optional	Optional	Optional	Your choice	Your choice

Swan/MS-DOS & GW BASIC 3.3 add \$89

Swan 386/20D

\$2199

Monitor not included

Base System with 5.25" 1.2MB Drive or 3.5" 1.44MB Drive Assembled & Tested IBM® AT Compatible MS-DOS®, OS/2® & UNIX® Compatible

386/20D	VIDEO OPTIONS Include Monitor & Video Adapter			
Drive Options	Mono	14" Flat Mono	VGA Mono	VGA Color
w/40MB (40ms) Hard Drive	\$2749	\$2798	\$2948	\$3248
w/80MB (28ms) Hard Drive	\$3049	\$3098	\$3248	\$3548
w/150MB (17ms) ESDI w/1:1 Interleave	\$3794	\$3843	\$3993	\$4293

Tower Case Option for 386/20
w/230W power supply add \$300

To order: No surcharge on MasterCard, Visa or AMEX ■ Your credit card is not charged until your order is shipped ■ COD orders accepted with no COD fee ■ We insure your order at no extra cost to you ■ Shipping: 3% or \$5 minimum for UPS Ground. Call for shipping charges on Express Air, APO, FPO, AK, HI and foreign orders ■ Mail Orders: We accept money orders, certified checks, and personal checks. Allow 2 weeks for personal and company checks to clear ■ Defective items replaced or repaired at our discretion ■ PA deliveries add 6% sales tax ■ Prices and terms subject to change without notice ■ We accept purchase orders from qualified Educational and Corporate institutions

Member of:
MMC
MICROCOMPUTER
MARKETING COUNCIL

VISA

MasterCard

Discover

OPEN: 8:00 AM - 11:00 PM Mon-Fri
10:00 AM - 8:00 PM Sat
12:00 PM - 8:00 PM Sun

Tussey Computer Products
3075 Research Dr.
State College, PA 16801

PWC1



Swan Technologies

distributed by **TUSSEY COMPUTER PRODUCTS**

Circle 207 on reader service card

called Princeton's service center to discuss this recurring problem. Princeton repaired the monitor, but it failed again 14 months later.

My repair bills are now approaching the purchase price, which means I've paid for my monitor twice. The frequency of failure is even more alarming considering that I only use the monitor at home about 10 hours per month. This works out roughly to a 100-hour mean time between failures.

*Mark Cybulski
Northbrook, Illinois*

Princeton Graphic Systems

responds: We were surprised to hear Mr. Cybulski's HX-12 has been so unreliable and has become such a poor investment, es-

pecially since this color monitor's failure statistics have been low compared to our competitors'.

To resolve the dilemma, Princeton is providing Mr. Cybulski with a new HX-12E color monitor. This unit is very similar to the HX-12; it allows you to use the IBM CGA to view up to 16 colors. For better color and resolution, you can add an IBM EGA to display up to 64 colors. The unit automatically adjusts itself to the card you're using.

*Nancy L. Brenfleck
Marketing and Sales
Administrator*

Upgrade of the Month

Peter Norton Computing's upgrade policy is unfair, inconvenient, and overpriced. In August I mailed in my two master disks of *The Norton Utilities* with a check for \$25. The company

ignored my instructions and mailed me the wrong-size disk. In September I finally received the correct disk. Only one month later, Peter Norton announced a new version. I called customer service and was informed that an upgrade would cost \$44. They refused to offer a credit of any kind. What is this, an upgrade-of-the-month club?

*Kurt Sletterdahl
Edina, Minnesota*

Peter Norton Computing

responds: In June, Norton Computing quickly responded to IBM's announcement of the imminent release of DOS 4.0. To support our customers who decided to upgrade to DOS 4.0, we developed a compatible "maintenance release" of *The Norton* (continues)

... And has RamFont?

A. The Hercules Graphics Card Plus and a monochrome monitor!

They deliver high-performance video for a lot less than you'd have to pay to get color. Crisp monochrome text is easy to read, and the exclusive Hercules RamFont video mode adds a powerful new dimension to popular programs such as WordPerfect 5.0 and Lotus 1-2-3. Your favorite desktop publishing, drafting/design, and business graphics programs support the industry standard Hercules graphics mode—and they'll run faster in monochrome than in color.

Why pay for color when you print out in black-and-white?

For more information about how you can get more out of monochrome while paying less than for color, call: 1-800-532-0600, ext. 134 (U.S.) or 1-800-323-0601, ext. 135 (Canada).

© Copyright 1989 Hercules Computer Technology, Inc., 921 Parker Street, Berkeley, CA 94710. Hercules, Hercules InColor and RamFont are trademarks of Hercules Computer Technology, Inc. All other product names are trademarks of their respective holders.

Circle 83 on reader service card



Hercules

Utilities—not an upgrade. To cover our costs, we set a nominal charge of \$20 plus shipping and handling.

In October, we announced a brand new release of *The Norton Utilities* that is chock-full of new features. That's why we charge \$39 for Advanced Edition users (\$25 for Standard Edition users), plus \$5 shipping and handling.

Patti Payne

Manager, Customer Support

When Wording Is Confusing

In August I returned a copy of *Oracle* to Oracle Corporation. I spent \$17.70 on postage to return the product, and I feel I'm entitled to a refund of that amount.

After reading *Oracle's* ad, I thought I was buying the product for \$199, period. Nothing in

the ad explains that the buyer is legally obligated to pay an additional \$1000 if the product is going to be used in any business applications. I realized that fact only after reading the license agreement that came with the package. I wonder how many readers will understand that this is the meaning of "for development only."

Rod Stewart

Hillsdale, Missouri

Oracle Corporation responds:

Our ad coupon states that the \$199 version of *Oracle* is for development only. In other words, it is not intended for running production applications on a day-to-day basis. We have had very favorable reactions to this offer, since it allows someone to get started with *Oracle* without making a major investment.

Although we have had no other complaints like this, we are genuinely concerned that Mr. Stewart finds the wording of the ad vague. We will take his criticism into account in developing future ads. We have also made arrangements to refund Mr. Stewart's shipping charges.

Bruce Mitchell

Vice President,

PC Products Division

PC Plaudits

When I purchased my computer from Whole Earth Electronics, I based my decision on two factors: your review ["XTs for Bargain Hunters," *PCW*, August 1988] and the helpfulness and candor of the salesman on the phone.

(continues)

Protects while you type!



- **Remains in Place** while you use your computer.
- **Avoids Costly Repairs.** Protects delicate electronics from dust, spills, smoke, ashes, staples.
- **Soft, Flexible,** retains normal keyboard feel.
- **Washable, Durable High-Tech Polymer** lasts years.
- **Hundreds of Models.** SafeSkin is available for most PCs, laptops, workstations and clone keyboards.
- **Office • Home • Factory • Classroom • Laboratory**

List Price \$29.95. Please call or write for free color brochure. Dealer inquiries encouraged.

SafeSkin™

Keyboard Protector

Merritt Computer Products, Inc./4561 S. Westmoreland
Dallas, Texas 75237/(214) 339-0753 • Fax (214) 339-1313
In Canada call 1-800-663-1061

Prevent Computer Theft!

Käblit Systems

Unique Käblit fasteners attach to equipment without drilling, using existing screws. Cable passes through fasteners preventing removal. Cable is then locked. When ordering multiples, specify locks keyed differently or alike. Installs in 10 min. Over 80 college installations.



Käblit works with:

- Computers
- Printers • Disk Drives • Typewriters • Stereos
- Monitors • Lab Equip. • Televisions • Other



\$54.95 postage paid. Quantity pricing also avail. for schools, institutions, businesses, etc. Send P.O. Money back if returned in 30 days.

SECURE-IT Inc. 10 Center Square • E. Longmeadow, MA 01028

800-451-7592 413-525-7039

Dealer Inquiries Invited



EXCLUSIVE!

Proprietary components prevent removal of mounting screws. (Pat. Pend.)

I had never dealt with a mail-order company for electronic equipment, and this experience has been wonderful. Whole Earth honored the price listed in your article and included a surge protector plus some software. The computer arrived with the hard disk formatted and with DOS already loaded. All I had to do was plug it in. I had a little trouble with the keyboard, but Whole Earth replaced it within a week of my first (and only) phone inquiry.

I was concerned about ordering by mail; after dealing with Whole Earth, I'm recommending the system to all my friends.

Susan J. Buck

Greensboro, North Carolina

To send correspondence or to submit material for publication in this column, please see How To Contact PC World, page 4. ●

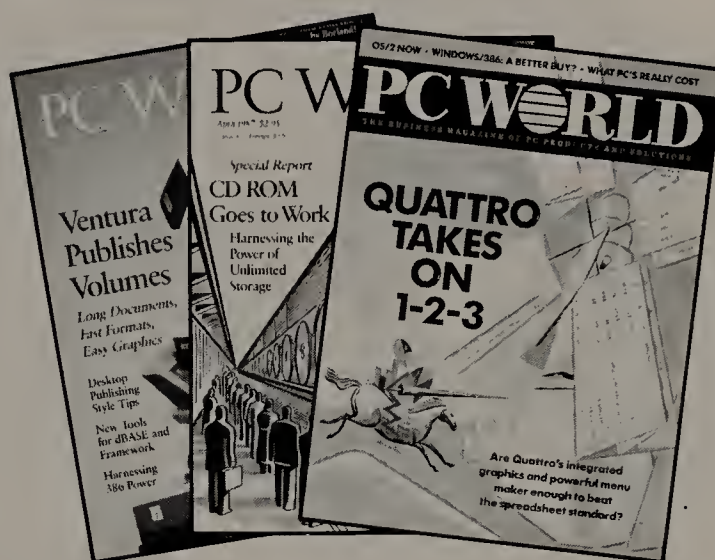
POWER TIP NO. 39

WordStar Macros at Your Fingertips

To run a WordStar 5.0 macro, you usually press <Esc> and a letter key. Touch typists and keyboard jockeys who find it awkward to lift a hand from the keyboard should try pressing <Ctrl>-[and the appropriate letter key to start macros. Substituting two keys for one may sound slow, but keeping your fingers on the keyboard speeds up input.

George Beinhorn
Nevada City, California

BACK ISSUES



Missing something? Back issues are available for \$6 per copy (U.S. and Canada), while supplies last. Rate includes surface delivery. If you wish airmail delivery, please add \$6 per copy (U.S. and Canada). For all other countries, back issues are \$20 per copy, which includes airmail delivery. For foreign orders, prepayment is required in U.S. dollars.

Simply enclose payment, specify the issues and quantity you desire and send to:

PC WORLD

Back Issue Department
144 Townsend Street
San Francisco, CA 94107

Sorry, phone or credit card orders cannot be accepted.

Case History #60302



"With branches in North America, England, Switzerland, Australia, New Zealand, and Hong Kong, we needed a database solution that could run on a world of different PCs, LANs and minicomputers," said Eva Nohra of Drake International, one of the world's most successful personnel service agencies. "We chose DataFlex for all our in-house programming because it gave us this needed capability while providing a standard interface that looks and performs the same on a stand alone PC as it does on a LAN or MicroVAX."

No programming changes required from system to system.

"DataFlex delivers, by far, more combinations of hardware and operating systems than any of the competition, and DataFlex source code is transportable, without

change, to every supported system. That's very important to Drake International because it gives each office the flexibility to acquire the computer hardware that is best suited to a situation without worrying about re-inventing the wheel and spending a fortune on program development. All we need to do is install the run-time module for the desired system and we're up and running immediately with proven, standardized programming."

Easy to use for even the least technical operators.

"A major component of our recruitment and placement operations involves mailing lists. DataFlex's capability to quickly generate reports utilizing a wide range of variables is extremely important," explains Nohra. "DataFlex's intuitive 'Point and Shoot' Query technique makes it easy for non-technical operators, even those lacking previous knowledge of programming or query language syntax, to be productive after only minimal training. There are a lot of products which promise the world, but for Drake, DataFlex has really delivered."

"Lots of DBMS/4GL products promise the world... DataFlex delivered it for Drake International."

Eva Nohra, Drake International, Toronto, Ontario

Toll Free Sales Lines:

Nationwide:

1-800-451-FLEX

In Florida :

1-800-331-3960

Data Access Corporation

14000 S.W. 119th Avenue

Miami, Florida 33186

(305) 238-0012

TELEX: 469021 Data Access CI

FAX: (305) 238-0017

**Runs on over
50 OS's including**

OS/2



THE UPGRADE PATH

Hands-on advice for upgrading PCs, compatibles, and peripherals

Storage to go, the ultimate LaserJet
cartridge, and more

Hard Disk on the Run

For most users, portable mass storage means a 1.2MB floppy disk. And for good reason. Portable hard disk drives have a reputation for being fragile, expensive, and hard to install. Why, you may ask, doesn't someone make an external drive that's as rugged as Plus Development's Hardcard but can be attached to any system for a quick storage fix?

As you might guess, someone has. The Plato Hardpac 20 from Sunrise Technology Corporation not only matches the Hardcard 20's price, storage, and access speed, but it is truly portable.

Instead of plugging this book-size drive into a slot, like the Hardcard, you connect it to a Plato controller board that you install in a PC, XT, AT, or compatible system; the company supplies a 3-foot cable, so the Hardpac 20 can purr away just about anywhere on your desktop. Better still, you don't have to install drivers, modify CONFIG.SYS files, or even run your system's Setup program. People on a tight budget who need to share hard disk storage or are interested in backing up all the office PCs cheaply can simply buy extra controllers for their machines
(continues)



Hard to install, easy to use: The Hardpac 20 must be set up on an XT, but it's perfect for quick backups and cheaply sharing hard disk storage.

*Edited
by
Robert
Luhn*

ANTHONY RUSSO

FRED STIMSON

Block That Static!

Before you pop the top off your PC or slide that hard disk drive out of its box, take these precautionary steps to eliminate static—and to protect your hardware investment:

- Avoid wearing polyester clothing—you could easily build up a charge that could destroy the chips on an expansion board. Wear rubber-soled shoes or go shoeless, and don't handle other static-generating materials, such as polystyrene or Styrofoam, before upgrading a system.

- Leave hardware in its antistatic packaging until installation time.

- Minimize your chances of building up static electricity by limiting your movements. Keep needed hardware, tools, and software nearby.

- Just before you remove the device from its packaging, ground yourself by touching the fan grill on the back of a turned-off PC that's plugged into a grounded outlet.

- Touch only the nonconductive edges of any device you're handling. With most expansion boards, that means the thick green board the chips are mounted on; with disk drives, the outer metal frame. Whatever you do, don't touch the shiny metal slot connectors or cable connectors on the device. You could give the unit a very expensive jolt. —R. L.

at \$95 a pop. Security-minded users can unplug the drive in about 5 seconds and stash it in the office safe.

Unfortunately, the Hardpac 20 isn't the easiest drive to install. Instead of typing one or two commands to configure the drive, the Hardpac 20 forces you to fuss with FDISK and FORMAT. And though the drive will run off

most systems, you must initially configure it on a true Blue IBM PC XT or risk facing a long, torturous installation session. Another pain: If you want to create a bootable Hardpac, you must first disconnect the XT's hard disk controller and then partition the Hardpac. First-time upgraders should also be wary of the user manual, which occasionally leaves out steps, contradicts itself, and includes a few deadly typographical errors.

As with all such upgrades, park the PC's hard disk if it has one, turn off the system, unplug all external cables, remove the system cover, and ground yourself before touching any component. Place the Hardpac 20 controller board on its antistatic wrapper and locate the jumpers at the 6 o'clock and 9 o'clock positions. If you're installing the board in an XT that already has a hard disk, for example, make sure the jumpers cover the two rightmost pins on each jumper block. (Ignore the accompanying illustration in the manual—it shows incorrect settings.) Pop the board into a free slot and connect the supplied cable to the board and to the back of the Hardpac 20. Reassemble the system but don't put the cover back on yet—you may have to change jumpers on the controller if it conflicts with other boards in the system.

Slip a formatted floppy system disk containing FDISK and FORMAT into drive A: and turn on the computer. The Hardpac 20 will click and whirl while the XT

goes through its usual motions, stops, displays a message like 'EXTERN ROM CA00', and after 10 seconds finally boots up. (If the system freezes, turn it off and make sure the jumper settings on the board are correct.)

Here's where you must be careful, because unless you're creating a bootable Hardpac (and disabling the XT's hard disk), it's easy to format the wrong drive. Type **A:FDISK** and then log on to the Hardpac 20 by selecting option 5 (Next Hard Drive) from the opening FDISK Setup Program menu; 'Current Fixed Disk Drive: 2' should appear at the top of the screen. Now select 1 (Create DOS partition), then 1 again (Create Primary DOS Partition), and finally, answer 'Y' to the prompt asking if you want to devote the entire partition to DOS. When the job's done a few seconds later, press <Esc> and the system reboots.

Once the A> prompt reappears, type **FORMAT D:/S** to format the disk; in 4 or 5 minutes, the Hardpac 20 will be ready to hit the road. Note: Contrary to the manual's warnings, the Hardpac 20 and the computer you tie it to don't have to be using the same version of DOS. However, if the computer already has a hard disk, you can't boot it off the Hardpac 20. The drive also demands a whopping 20 watts at start-up—so those with older PCs and Compaq portables should consider getting more capable power supplies.

The take-anywhere hard disk is clearly an idea whose time has come, and the Hardpac 20 is a pretty fair implementation. Just *(continues)*



U.S. MAIL

When We Challenged Our Competitors' Customers To Try PC Tools, This Was Their Answer.

A couple of months ago we gave users of Norton[™], Fastback[™], Sidekick[®], X-TREE[™], Mace[™], and Disk Optimizer[®] a chance to upgrade to the number one selling utility package: PC Tools[™] Deluxe.

A few days after the ads ran we started getting bags of mail, week in and week out, from customers anxious to get something better than what they already owned.

But why would they opt for PC Tools Deluxe as opposed to staying with what they already had? Simple. Because it's a far better product. It includes the best of what the others offer, and a lot more.

You see, PC Tools Deluxe is the only product to give you a DOS Shell, data recovery utilities, a hard disk backup program, and a desktop manager all in one box. Which means you won't have to learn the ins and outs of a whole bunch of products.

Circle 155 on reader service card

Just one—PC Tools Deluxe.

The only one with pull-down menus, full mouse support, and a windowed environment that lets you run up to 15 of our desktop applications at once.

The only one with an operating environment so consistent throughout that once you've learned one application you'll be proficient in them all.

And the one that has received PC Magazine's Editor's Choice Award not just once, but twice.

So if you're looking to buy the best, buy PC Tools Deluxe first. You won't be disappointed.

Central Point Software INC.
A VIDEO TECHNOLOGY COMPANY (503) 690-8090.



remember that it's not for upgrade neophytes. Until the designers of the Hardpac 20 follow the Hardcard's example and make installation simple, automatic, and bulletproof, leave this upgrade to a pro. —R. L.

WHERE TO BUY

Plato Hardpac 20

Sunrise Technology Corp.
3226 Beta Ave.

Burnaby, British Columbia
V5G 4K4 Canada

800/663-2237, 604/294-1113

List price: \$695, board and cable \$95, complete package \$785

Requirements: 256K RAM, DOS 2.0 or later version

Warranty: 30-day money-back guarantee, one year parts and labor

Technical support: unlimited phone support, toll-free number, M-F 8:30-5

Other support services: none

For more information, circle 640 on reader service card.

More Fonts at Your Fingertips

If you're like most Hewlett-Packard LaserJet users, you probably find using downloadable (or "soft") fonts a hassle. Yet the LaserJet's humdrum internal Courier and Line Printer fonts don't give a document much visual punch. The quick and easy solution, of course, is to reach for an HP font cartridge. Unfortunately, HP's font cartridges cost an average of \$200 apiece, and no single cartridge holds all of a font's variations (bold, italic, portrait, landscape, and so on). Until now.

Thanks to Pacific Data Products, font-hungry LaserJet users can turn to 25 Cartridges in One!, a single cartridge that packs 103 fonts yet costs only \$399—pocket money compared to the \$5000 tab for the entire HP collection. The equivalent of just about every HP cartridge is crammed into this product, with the exception of bar code characters and some miscellaneous symbols. You can use 25 Cartridges in One! with the LaserJet Plus, 500, 500 Plus, and Series II and IID, as well as Canon's LBP-8II. Software compatibility, however, is currently limited to 1-2-3, Microsoft Word, MultiMate Advantage II, and WordPerfect 4.2 and 5.0. Pacific Data plans to supply a Windows 2.03/386 driver free to registered users in short order, followed by drivers for XyWrite, WordStar, DisplayWrite, and Samna Word V. If your program isn't supported and you're comfortable using escape sequences, however, Pacific Data's thorough, illustrated user manual supplies the necessary information.

Using 25 Cartridges in One! is a snap. To access the cartridge's portrait and landscape fonts with Word, for example, copy the supplied PAC25P.PRD and PAC25L.PRD drivers to Word's subdirectory. Then run Word, load the document, and select either driver as you would any other by pressing <Esc>, selecting Print Options, pressing <F1>, highlighting the driver's name, and pressing <Enter>. To select the typeface and point size, highlight the characters in the document, press <Esc>, select Format Character, tab down to the Font Name option, and press <F1>. A list of available fonts cascades onto the screen. Highlight your

selection, press <Enter>, go back to the Format Character menu, select the font size, and you're ready to print.

No upgrade is completely trouble-free. The font you want may be hard to find, especially if it's one of the eight Courier fonts with the same name but different character sets. You'll find yourself flipping through the user manual's font tables frequently, but that's a small price to pay for this cornucopia. Unfortunately, 25 Cartridges in One! doesn't support WordStar—or the original LaserJet, Canon's LBP-8A1, or other LaserJet compatibles. But for the majority of LaserJet and Canon users, 25 Cartridges in One! is a simple and inexpensive tool that's a bargain by anybody's standards.

—Matt Lake

WHERE TO BUY

25 Cartridges in One!

Pacific Data Products
6404 Nancy Ridge Dr.
San Diego, CA 92121
619/552-0880

List price: \$399

Requirements: HP LaserJet (Model 500 or higher), Canon LBP-8II or LBP-8C

Warranty: lifetime

Extended warranty: none

Technical support: unlimited, no toll-free number, M-F 7:30-5

Other support services: none

For more information, circle 641 on reader service card.

Matt Lake is PC World's Andrew Fluegelman editorial intern.

To send correspondence or to submit material for publication in this column, please see How to Contact PC World, page 4. ●

Morgan Steenman & Tuininga

Business Development & Marketing Group

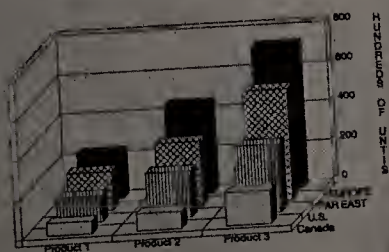
October 27, 1988

Mr. Charles Bostwick
Bostwick Parker Company
13644 148th Avenue
Detroit, Michigan 49684

Dear Mr. Bostwick:

The results of the computer simulation are in, and you'll find them quite fascinating. Here is an interesting surprise: the greatest sales potential exists with product three. What's more, the largest sales will be in Europe and the Far East, not the United States.

Bostwick Parker Co.
New Product Sales Projections



These sales projections take into account the requested in the model. Specifically, the simulation was reduced to reflect the

Morgan Steenman & Tuininga

Business Development & Marketing Group

9411 S.E. 16th Street, Suite 100
Mercer Island, Washington 98040
206/236-2566
FAX: 206/236-1404

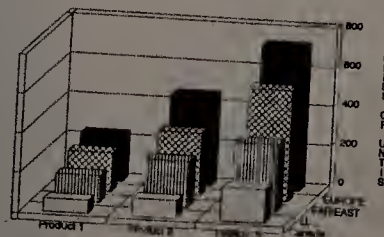
October 27, 1988

Mr. Charles Bostwick
Bostwick Parker Company
13644 148th Avenue
Detroit, Michigan 49684

Dear Mr. Bostwick:

The results of the computer simulation are in, and I think you'll find them quite fascinating. Here is an interesting surprise: the greatest sales potential exists with product number three. What's more, the largest sales will result from Europe and the Far East, not the United States.

Bostwick Parker Co.
New Product Sales Projections



These sales projections take into account the requested in the model. Specifically, the simulation was reduced to reflect the

CAN YOU SPOT THE \$700 DIFFERENCE?

One of the nearly identical samples you see above was printed with the HP Laserjet Series II. The other is from the Mannesmann Tally® MT905. Both are reprinted here exactly as they came out of the printers.

But what might surprise you is the rather dramatic difference in the manufacturers' suggested retail prices.

The Mannesmann Tally laser is \$700 less. Yet it offers the same high quality output, lowers operating costs 25 percent, and prints at six pages per minute.

The MT905 comes with the same resident type fonts as HP, accepts standard HP font cartridges, and lets you choose optional memory upgrades from one to four megabytes.



MT905 Specifications

- Technology: scanning laser.
- Print Speed: 6-pages per minute.
- Resolution: 300 x 300 dpi.
- Emulations: HP Series-II. [optional emulations: Epson® IBM® Proprinter, & Diablo 630.]
- Standard I/Os: Serial & parallel.
- Memory: 512K. [upgrades: 1, 2, & 4 megabytes.]
- Typefaces: Courier medium & bold, line printer, accepts standard HP font cartridges or any downloadable font in HP-format, 6-resident fonts + 2 font cartridge slots.
- Paper Handling: 250-sheet input & output bins. Manual feed handles single sheets, envelopes, transparencies, and labels.
- Workload: 4,000 pages-per-month.
- Suggested Retail: \$1,995.

For more convenient paper handling, the universal paper cassette holds letter, legal, and international sizes, plus up to 15 standard envelopes. You can choose face-down output to keep long documents in the right order. And the manual feed lets you print labels or transparencies.

So any way you figure, the answer still comes up the same. The Mannesmann Tally laser looks perfect. And so does the price.

For the name of your nearest dealer, call the toll-free number listed below.

**MANNESMANN
TALLY**

1-800-843-1347

Ext. 303

Epson and IBM are registered trademarks.

Circle 112 on reader service card

PCWORLD Profile

TOPS tells why PC WORLD works for them.

"PC WORLD is a critical part of our marketing mix. We put a strong advertising emphasis on PC WORLD because we're convinced that the magazine reaches an important part of our market, especially the department manager for the workgroup and the power user."

On reaching readers ready to buy.

"We're pretty hot on the book. I think the best thing I can say about our involvement with PC WORLD is that it's a magazine that reaches a marketplace which is ready and waiting to adopt a solution like TOPS."

On readers who manage the buying process.

"I think people who read PC WORLD want an information source that helps them manage the buying process. PC WORLD covers a lot of ground — making critical computing issues accessible to people who make purchase decisions that could affect their company's short-term health and long-term viability."

On reaching readers who make decisions.

"We need the people who are directly affected by and interested in solutions TOPS provides. But often they are just part of the decision-making process. We also need to reach the business buyers and PC coordinators — people who need to understand what solutions are available in the marketplace and often determine what is actually purchased. PC WORLD delivers them for us."



Rich Shapero, VP and General Manager, TOPS division, Sun Microsystems, speaks on the value of PC WORLD as an integral part of their success. The TOPS division specializes in developing and marketing networking products for IBM-PC's, Apple Macintoshes and Sun Workstations.

On TOPS and why PC WORLD is important to them.

"In the past twelve months, some amazing things have happened at TOPS. We've shipped more than 400,000 TOPS network nodes. We think we're seeing the emergence of a

new product category for the micro-computer industry—the plug-and-go LAN. My favorite statistic is that TOPS nodes now rival monthly Ethernet board volumes. We've gone to PC WORLD to continue to tell the TOPS story — the growing consumer acceptance of a network solution that makes sense. PC WORLD works for us."

Circle 900 on reader service card

PCWORLD works.



THE HELP SCREEN

PC World offers answers and advice at every level

Mate DOS 4.0 with your compatible, merge your return address in DeskMate, avoid the 1.2MB DISKCOPY shuffle, convert WordPerfect 4.2 macros to 5.0, lock intruders out of drive A:, and more.

**Karl
Koessel**

A DOS for All Systems

Q. *I have some questions about IBM's DOS 4.0. Will it work on my XT clone? If not, where can I get its MS-DOS counterpart? Will it support my old RAM expansion boards?*

*Ross R. King
Rancho Cordova, California*

A. Without knowing the specific components in your XT clone, I can't give a definitive answer. IBM DOS 4.0 does work on IBM PCs, XTs, ATs, AT 286s, PC Convertibles, and PS/2s. Presumably, it works on any compatible system, provided that the system's ROMs are not too old. Most very old clones will not boot DOS 3.2 or later versions without a ROM upgrade.

If your system's manufacturer offers DOS 4.0, you may be better off with that version than with another company's offering; your manufacturer's release would support any special features your clone might have. Call the company and ask if DOS 4.0 will run on your system and if the company sells it. For "generic" clones, manufacturers usually sell what's known as retail MS-DOS, a Microsoft product that's also available via mail order and at your local computer store. In any case, your memory boards will function as they always have—no better, no worse.

Addressing DeskMate

Q. *I have read more than once in PC World's Star-Dot-Star column about using ANSI.SYS to redefine keys. I have tried several times, without luck, to create an ANSI.SYS macro to enter my three-line name and address.*

After reading Tom Swan's note under "AutoCAD in Comfort" [Star-Dot-Star, PCW, November 1988], I concluded that Tandy's DeskMate program does not recognize ANSI.SYS key assignments. However, even at the A> prompt, I get only part of what I want, and it's all on one line. Is there a limit to the size of an ANSI.SYS macro?

"AutoCAD in Comfort" included a table of ANSI.SYS extended key codes for certain key combinations. Would you please tell me the codes for <Alt>- and <Ctrl>-lowercase letter and <Alt>- and <Ctrl>-number combinations?

*Thomas Minnich
Archer City, Texas*

A. Almost all word processors take over the keyboard and therefore do not recognize ANSI.SYS key reassignments. You need another way to automate entering your name and address into the letters you write. Such a task is usually accomplished using a word processor's macro capability, but Text, DeskMate's word processor, doesn't (continues)

do macros. To accomplish the task, make a small Text file containing your three-line address and a blank line, and save it with the single-character name **A** (*DeskMate* adds the .DOC extension). Then, whenever you need to insert your address, position the cursor, press **<F2>** (the Files key), press **M** to highlight 'Merge', press **<Enter>** to execute the function, press **A** to highlight A.DOC on the Files list in the Merge File dialog box, and press **<Enter>** to merge in your address.

Although *DeskMate* doesn't recognize ANSI.SYS reassignments, knowing how to make multiline assignments may prove fruitful with other applications. The command `PROMPT $e[0;104;"Your name";13;10;"Your address";13;10;"Your city, state, and ZIP code";13;10;10p` will assign your three-line address to **<Alt>-<F1>**. The ;13s and ;10s are the ASCII codes for the carriage returns and the linefeeds required to separate your address into three lines and add an extra linefeed at the end of the address.



Lockette prevents unauthorized use of your computer.

Since the DOS command line accepts only 127 characters, using a DOS command to make an ANSI.SYS reassignment limits you to 127, minus about 20 for the command itself. But you can assign a string of 192 characters, entered as ASCII codes or within double quotes, to a key: Save the ANSI.SYS reassignment escape sequence in an ASCII file—called, for example, ANSIKEY—and then issue the command `COPY ANSIKEY CON`. Because the reassignment string and the assigned key are kept in a static buffer of memory, increasing the number of assigned keys decreases the number of characters that can be assigned. Also, some public-domain versions of ANSI.SYS have larger assignment buffers than that provided by DOS's ANSI.SYS.

Your keyboard doesn't differentiate case for **<Alt>-letter** combinations; it sends the same code for **<Alt>-A** as it does for **<Alt>-a**. The same holds true for **<Ctrl>-letter** combinations. These, however, are not extended keys; their ASCII codes are 1 through 26. The keyboard does not send codes for **<Ctrl>-number** combinations. The ANSI.SYS extended key codes for **<Alt>-1** through **<Alt>-0** are 0;120 through 0;129.

ROM BIOS Drive Support

Q. *I read "3½-Inch Drive in a Compaq Portable" [The Help Screen, PCW, August 1988] and decided to put one in my very early model Portable. Installation was fairly simple and the drive works—sort of. Although it can read disks that were formatted to 720K, it can't itself format*

a floppy to 720K. I've tried the DRIVPARM and DEVICE = DRIVER.SYS commands, but nothing makes a difference. Is there something I'm missing?

Dale Paulson

Alexandria, Virginia

A. Yes, but you won't find it in the August item. In order for a system's 3½-inch drive to format 720K disks, its ROM BIOS must contain support for that type of drive. I neglected to mention in the August item that your Compaq Portable's motherboard must have revision G or later ROMs. Sorry about the inconvenience. Contact your local dealer for an upgrade.

Nine-Bit Bytes?

Q. *While adding RAM to an XT motherboard, I noticed that each bank contains nine chip sockets. Since each 64-kilobit chip contributes a single bit to each byte of RAM, and each byte consists of 8 bits, 8 chips provide 64K of memory. So what's the ninth chip for?*

Michael Matthews

Trumbull, Connecticut

A. The original IBM PC was designed with nine dynamic RAM (DRAM) chips per memory bank, with the ninth chip used for parity checking. Parity checking helps ensure that memory values are valid. It works by setting the parity bit of a particular byte to 0 or 1 depending on the number of 1 bits in that byte. Before a byte is used again, its parity value is checked against that byte's number of 1 bits. If the parity value is valid, processing continues; otherwise the system halts. A better design


```

ECHO OFF
CLS
DEL C:\TEMP\*.* <C:\DOS\YCR >NUL
PAUSE Insert SOURCE disk in drive A:
C:\DOS\XCOPY A:\ C:\TEMP\*.* /E/S
ECHO Remove SOURCE disk from drive A:
PAUSE and Insert a blank, formatted TARGET disk
C:\DOS\XCOPY C:\TEMP\*.* A:\ /E/S

```

LISTING 1: Hard disk-based DATACOPY.BAT automates duplicating data files disks, quite handy for nearly full 1.2MB media.

would let you try to correct the byte value and proceed or, at least, would continue after warning you of the error.

The PC's parity-checking memory design has been carried over to the XT, the AT, PS/2s, 80386-based computers, and most compatibles. Therefore, when adding memory to 16-bit and 32-bit systems that use DRAM chips, you have to add 18 (not 16) and 36 (not 32) chips at a time, respectively.

DISKCOPY Dilemma

Q. *I use an Everex 80386/20 as an AutoCAD workstation under DOS 4.0. It has 2MB of RAM, a single floppy drive, and an 80MB hard disk. However, when copying an almost full 1.2MB disk with the DOS command DISKCOPY, I'm prompted six times to swap between the source and target disks. Why can't a computer with 2MB of memory do a 1.2MB DISKCOPY in one pass?*

Scott N. Smith

Edmonton, Alberta, Canada

A. It's not the computer that can't do DISKCOPY in one pass, it's the operating system. Before expanded memory, DOS could use only 640K to hold the operating system, running program,

and the program's data. DOS 4.0 takes at least 64K, and more likely 100K, counting device drivers and other system options. DISKCOPY takes more than 10K. Subtract the 75K minimum total from 640K and you're left with 565K, less than half the RAM necessary to hold 1.2MB of data. That adds up to three pairs of disk swaps.

Conceivably, DISKCOPY could be rewritten to recognize and use expanded memory in order to reduce the number of disk swaps. OS/2, which manages 16MB of memory, could also theoretically do the job in a single pass, but only if DISKCOPY were rewritten to make use of the extra memory. Unfortunately, such consideration of user needs is missing from DOS 4.0, the first DOS version to support expanded memory, and from OS/2.

It's unlikely that you'll see a single-pass DISKCOPY offering from an independent developer of software utilities. That may be good news for your data, though, because you really should use DISKCOPY as infrequently as possible. Since DISKCOPY copies the data in each sector of the source disk to the same sector of the target disk, the program requires a defect-free target disk to ensure that data is not "copied" to a defective sector, which won't retain it. You should use DISKCOPY only to make backup

copies of your program disks.

For copying a few data files from one disk to another, use the command XCOPY A:\ B:\ /E/S, even though you have only one floppy drive; the system will prompt you to switch disks. The /E tells XCOPY to duplicate on the target disk any of the source disk's empty directories. The /S tells XCOPY to duplicate any of the source disk's directories containing files, complete with the files. If the source disk contains no subdirectories, you can use the simpler command XCOPY A: B:.

To copy nearly full 1.2MB data disks, use some of that 80MB hard disk: Issue the command **MD C:\TEMP** to create a temporary subdirectory. Insert the disk to be copied into drive A:, and enter **XCOPY A:\ C:\TEMP /E/S** to copy the floppy's files, including those in subdirectories, to the hard disk subdirectory; use **XCOPY A: C:\TEMP** if the source has no subdirectories. Then, replace the disk in drive A: with a blank, formatted 1.2MB disk and issue **XCOPY C:\TEMP A:\ /E/S**. Now that you have a backup floppy, issue **DEL C:\TEMP** to delete the files in the \TEMP directory, press **Y** to confirm, enter **CD C:** to change to the root directory of drive C:, and use **RD C:\TEMP** to remove the temporary directory.

If you make such copies often, don't remove \TEMP, just empty it. You may also want to create the batch file DATACOPY.BAT (see **LISTING 1**) to automate the procedure. DATACOPY.BAT should be kept in a directory listed in your system's PATH and requires that XCOPY is in the \DOS directory of drive C:, that you have a blank disk in the

(continues)

same format as the source disk, and that the directory C:\TEMP exists. It also requires a file called YCR, which consists simply of a Y and a carriage return, in the \DOS directory of drive C:. To create YCR, change to the \DOS directory, type **COPY CON C:YCR**, press <Enter>, press Y, press <Enter>, press <F6>, and press <Enter>.

WordPerfect Macro Menu Update

In last month's *Letters* column, reader James P. Hall lamented the fact that the custom *WordPerfect 4.2* menus described in George Beinhorn's "Macro Menus for WordPerfect" (*PCW*, February 1988) wouldn't work with *WordPerfect 5.0*. We promised an update, and here it is.

The MACROCNV.EXE program included on *WordPerfect 5.0*'s Conversion disk converts a 4.2 .MAC macro's text, cursor keystrokes, and 4.2 functions that are unchanged in 5.0 into the new version's .WPM format. Copy the macros you want to convert along with MACROCNV.EXE to the directory where *WordPerfect 5.0* resides. Then enter **MACROCNV file name**, where *file name* is the name of a 4.2 macro; you don't need to type the .MAC extension. You could include multiple file names on the command line for a mass conversion, but don't—important information would scroll off the screen after the first few files were converted.

MACROCNV.EXE appends the warning '{;} BAD! ~' after each version 5.0-incompatible command it finds, then cheerfully informs you that some manual editing is necessary. To finish off such a partially converted macro, open it in *WordPerfect 5.0*'s macro editor (press <Ctrl>-<F10>, type the macro's name, then press 2 or E), locate any commands marked with the BAD! label, and replace them with the appropriate *WordPerfect 5.0* command.

Since the Merge command sequence used in George Beinhorn's pop-up menus article did not change in 5.0, MACROCNV.EXE converts the menus without a hitch. However, in each menu macro, the article omitted an important code required to execute the macros at the cursor position rather than at the end of the document: Append a ^Q (<Ctrl>-Q) after the final ^G^O combination at the end of each menu macro.

Lock a Floppy Drive

I recently learned of a new product that delivers one more way to prevent booting from drive A: (see "System Security," *The Help Screen*, *PCW*, February 1989). The Lockette is a lock that you affix to the front of any 5¼-inch floppy drive that uses a lever rather than a door. The device prevents insertion of a floppy disk, which might be designed to bypass system security, or removal of a nonbooting floppy disk, which generates the error message 'Non-System disk or disk error; Replace and strike

any key when ready'. Although it won't stop a hacker with a crowbar, this lock is a simple, effective deterrent to unauthorized access.

WHERE TO BUY

Lockette

Z-Lock Manufacturing Co.
1201 N. Catalina Ave.
P.O. Box 949
Redondo Beach, CA 90277
213/372-4842, FAX 213/372-1598

List price: \$16.95

Requirements: 5¼-inch floppy drive with lever (Macintosh drive version also available)

Warranty: one year

For more information, circle 700 on reader service card.

System/36 Correction

While developing the solution to rebooting automatically with an alternate CONFIG.SYS (see "Irreconcilable Drivers," *The Help Screen*, *PCW*, December 1988), I was unaware that PC Support/36 by default installs a configuration file (for identifying virtual disks, printers, token ring network messaging facilities, and so on) called CONFIG.S36 in the root directory. Therefore, you should not use the file name CONFIG.S36 as shown in the December item; use another name, such as CONFIG36.SYS, instead. My thanks to reader Russell Zipoff for bringing this matter to my attention.

To send correspondence or to submit material for publication in this column, please see How to Contact PC World, page 4. ●

FREE GIFT!

And 44%
Savings if You
Subscribe Now.

This
PC World
see-through
solar calcu-
lator can be
yours FREE just
for subscribing to
PC World. Your
special gift features:

- Amazing crystal-clear body with invisible circuitry
- Credit card size convenience
- Multi-function memory
- Special function keys: square roots, automatic percentages, etc.
- Easy-to-read liquid crystal display
- Advanced solar panel cell—it never needs batteries!

It's all yours FREE with your subscription to *PC World*, the magazine for PC decision-makers. Every month, we show you the personal computing world the way no one else will. In-depth product reviews and recommendations. Tips from power users to make YOU more valuable. Industry developments, columns, features... *PC World* doesn't just tell you what's happening today, it tells you what to expect tomorrow.

Don't wait. If you act now you can have a full year of *PC World* for only \$19.97—that's almost 44% off the cover price. Plus you get the amazing *PC World* see-through solar calculator—FREE with your subscription to *PC World*.



Rush me my FREE GIFT and one year (12 monthly issues) of *PC World* for only \$19.97. That's almost 44% off the annual cover price and over 33% off the regular subscription rate of \$29.90.

NAME _____

COMPANY _____

TITLE _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PC WORLD

4CN70



SOLUTIONS!

Rush me my FREE GIFT and one year (12 monthly issues) of *PC World* for only \$19.97. That's almost 44% off the annual cover price and over 33% off the regular subscription rate of \$29.90.

NAME _____

COMPANY _____

TITLE _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PC WORLD

4CN70



ORDER NOW!

44% Savings and a Special FREE GIFT.
See other side for details.



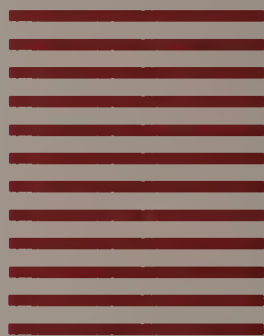
BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
Subscription Department
P.O. Box 51833
Boulder, Colorado 80321-1833

NO POSTAGE
NECESSARY
IF MAILED IN
THE UNITED STATES



Mail the
attached
card today.
See other side
for details.



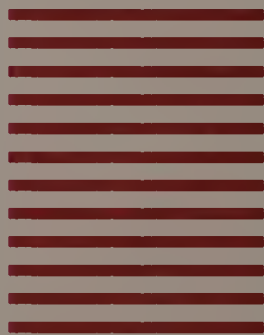
BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1262 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
Subscription Department
P.O. Box 51833
Boulder, Colorado 80321-1833

NO POSTAGE
NECESSARY
IF MAILED IN
THE UNITED STATES



Mail the
attached
card today.
See other side
for details.



Quicken is easy because it looks like your paper check-book. There's nothing new to learn.

Quicken automatically updates your check register, recalculates balances, and prints your checks.

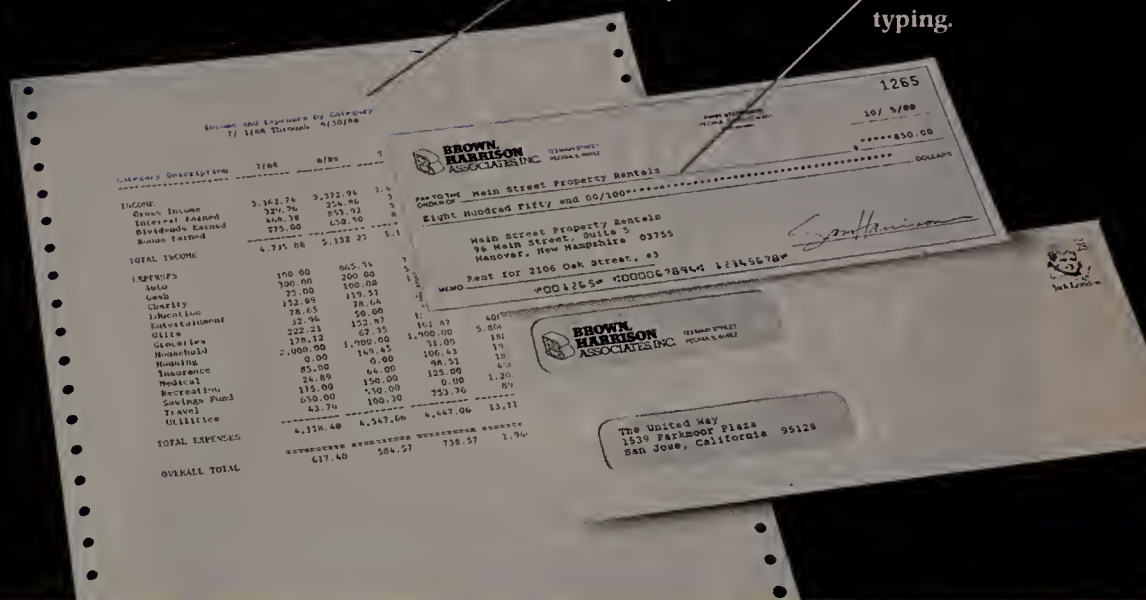
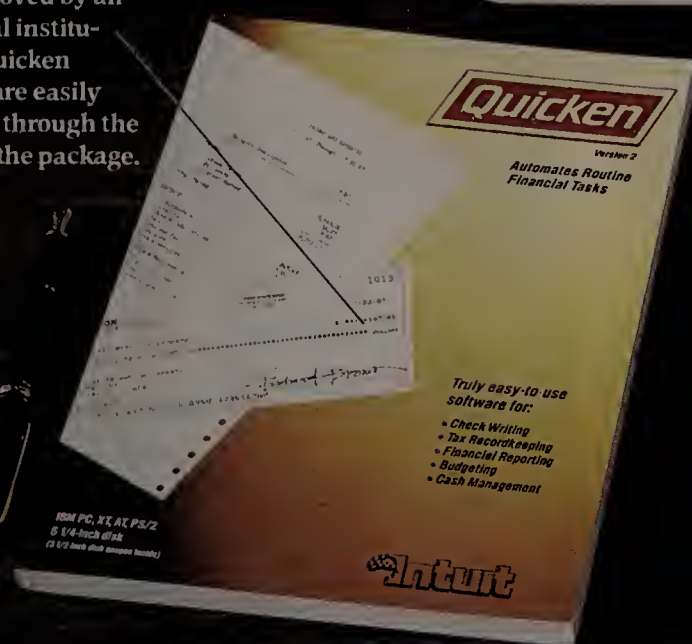
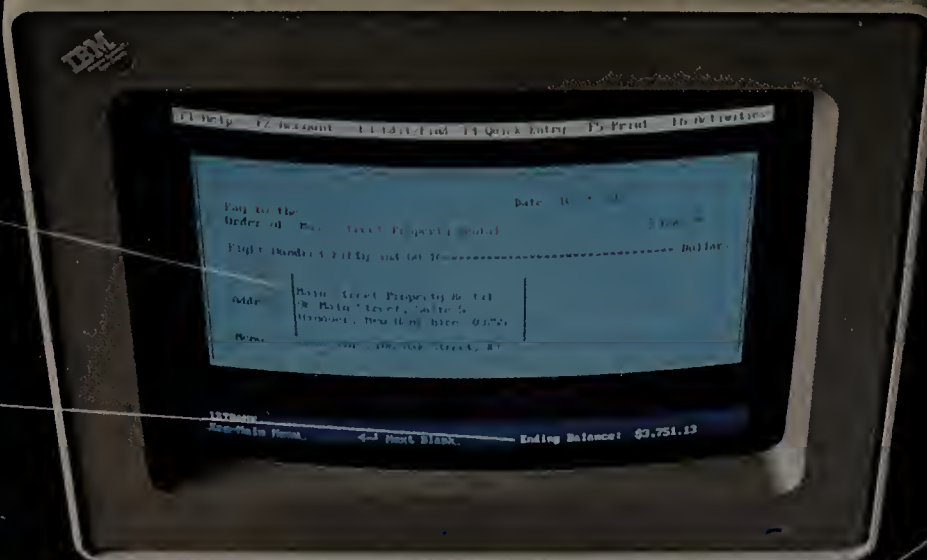
Quicken prints checks even on user printers. Preapproved by all financial institutions, Quicken checks are easily ordered through the form in the package.

Quicken gives you these reports in seconds:

- Budget vs. Actual
- Taxable Income/ Deductions
- Income and Expenses (P&L)
- Rental Property/ Job Costs
- Accounts Payable
- Cash Flow/Cash Needs
- Payroll Taxes.

Quicken eliminates work. It instantly writes recurring checks without typing.

Now Links with Tax Software



Stop Taxing Yourself. Quicken® \$49.95

Quicken® is the fastest, easiest way to do your personal and small business finances. You'll slash time and effort every month, plus have perfectly organized financial records. Now instead of dreading tax time, you'll save even more hours, because Quicken links directly to the top selling tax software, J.K. Lasser's *Your Income Tax*™ and Turbo Tax®.

Forget Financial Hassle

Quicken is so automatic, it does your monthly financial work for you. It actually learns your regular bills. Just confirm the payment amounts on your auto loan, utilities, and other bills. Quicken does 14 bookkeeping steps and hands you the printed checks already addressed for mailing. All you do is sign them and seal the envelopes.

Automate Your Taxes, Too!

Quicken saves you hours at tax time, because all your tax information is right at your fingertips. It prints itemized lists supporting tax deductions in just seconds. Or, you can let J.K. Lasser's *Your Income Tax* and Turbo Tax, quickly and accurately read income and deductions from your Quicken records and directly transfer that data to your tax forms.

Know Your Financial Situation in Seconds

Quicken gives you detailed reports such as budget vs. actual comparisons, income and expenses by category, accounts payable, accounts receivables, or P&Ls, on screen or on paper, almost instantaneously.

The World's #1 Selling Financial Software

Here's why Quicken is the world's most popular:

Absolutely the best small accounting program made.

—Bob Schwabach, Universal Press Syndicate

This intelligently designed finance program is easy enough to start using in minutes, yet powerful enough to completely organize both personal and small business finances.

—Steve Morgenstern, Home Office Computing

No Accounting Mumbo Jumbo

Quicken is as easy as the pen and paper you use now. You'll see the familiar checkbook and check register right on your screen. The only thing that changes is how fast you finish your financial chores. This is bookkeeping that's totally hassle-free.

For Personal and Business Use

No other financial software provides more flexibility to handle the wide range of personal or business needs. Quicken is for service and

Specifications
Software Compatibility: Exports data and reports in ASCII format. Also exports in Lotus® format with optional Transfer Utility.
Hardware Compatibility—Regular Version: All IBM® PC, AT® PS/2® and compatibles with 256K RAM and OOS 2.0 or higher. All printers. All monitors.
Hardware Compatibility—DeskMate Version: Tandy 1000 SL with 384K RAM or IBM PC, AT, PS/2, and compatible computers with 512K RAM and OOS 2.0 or higher. All printers. All monitors (monochrome monitors require a Hercules or compatible graphics card).
Also available for Macintosh® and Apple II®.
Capacity: Unlimited number of bank accounts. Unlimited number of transactions. Maximum amounts: \$9,999,999.99.
Other: Unlimited FREE technical support. Not copy-protected. Checks are pre-approved by all financial institutions in the U.S. and Canada. Sample checks and order form are enclosed in Quicken package.

manufacturing businesses, doctors, consultants, designers and retailers, as well as for households. Quicken is ideal for anyone who wants relief from bookkeeping hassles.

Try Quicken FREE for 30 Days

Order Quicken today from the coupon below, or through our toll-free 800 number. If you're not completely satisfied with Quicken for any reason, simply return it for a full, no-questions-asked refund.

Quicken

\$49.95

I want to try Quicken on your no-risk 30-day guarantee. If I'm not completely satisfied, I may return it within 30 days for a full refund. Quicken, \$49.95 plus \$3.00 shipping and handling. California residents add sales tax.

Call 800-624-8742

or, send this coupon with your check or credit card number to Intuit.

Name _____
Address _____
City _____ State _____
Zip _____ Phone _____

- ☐ 5¼" disk ☐ 3½" disk
☐ Regular IBM version ☐ DeskMate version
☐ Transfer Utility to Lotus (optional, \$19.95)
☐ Check enclosed (no purchase orders, please)
☐ Visa ☐ MasterCard ☐ Am Ex

Card No. _____

Expiration Date _____

Intuit 540 University Avenue
Palo Alto, California 94301

PW 0389

What does "BUY SMART, USE SMART" mean to **PC WORLD** advertisers?



PC WORLD is part of IDG's worldwide family of publication, exposition and research companies providing the best in information on the information technology industry.

International Data Group
5 Speen Street
Framingham, MA 01701-9171
(508) 875-5000

A way to "sell smart."

Editor-in-chief, Rich Landry helps *PC WORLD*'s readers to "buy smart, and use smart." *PC WORLD* guides business buyers through the entire buying process, from purchase to integration to upgrade to trade-in. First, we deliver the essential product information they need to make smart PC buying decisions. Then we follow-up, month after month, with the answers, power tips and advice they need to use their PCs more productively. To them, *PC WORLD* delivers more value than other PC books.

A knowledgeable, sophisticated reader is a knowledgeable, sophisticated buyer. The reviews in *PC WORLD* meet the highest standards of objectivity. Our readers know that. Which is why *PC WORLD* is a smart place to advertise your product. There is no more credible editorial environment for your advertising message.

More receptive business buyers mean more sales for your product. Call Mark Glasner at **415-243-0500** to find-out more about how you can sell smart with *PC WORLD*.



Answers for the Information Age.

Circle 900 on reader service card

STAR-DOT-STAR

* • *

A global exchange of personal computer discoveries

Stuff keystrokes into your keyboard buffer, save money with inexpensive refill ink for Epson ink jet printers, explore the power of a single dot, and reduce 1-2-3 ERRs to nothing.

*Edited
by
Tom
Swan*

The Right Stuffer

Are you tired of having to press <Enter> to get past opening screens that demand you 'Press <Enter> to continue'? If so, you can use my program PRESS.COM to stuff up to 15 key-strokes into your keyboard buffer, letting you write batch file commands to "press" most any key on a typical PC keyboard. For example, to move past the opening display of the Lotus 1-2-3 Access System and execute 1-2-3, use the batch file command PRESS "LOTUS" CR CR "/FR". PRESS interprets the first CR as <Enter>, which causes the text in quotes to be executed just as though you had typed LOTUS <Enter> on the command line. PRESS also interprets the second CR as <Enter>, which starts 1-2-3, and then enters the keystrokes /FR, which retrieve a file.

In addition to quoted characters and CR, PRESS.COM understands the two-letter codes that represent the various keys listed in **TABLE 1**. (Each code must be in uppercase.) PRESS.COM can also type control keys, indicated by a caret prefix. For example, the command PRESS ^C enters a Control C into the keyboard buffer. Other useful examples are PRESS "FOXPLUS" CR F1, which starts *FoxPlus* and jumps directly to the help screen; and PRESS "LOTUS" CR RT RT CR, which loads the Lotus 1-2-3 Access System,

presses <Cursor Right> twice, and then presses <Enter>, to select the Translate Utility.

*Murray A. Kristell
Mayfield Heights, Ohio*

Editor's note: To create your own copy of PRESS.COM, first bring up BASIC, then load XMAKER2.BAS (LISTING 1), use the MERGE command to append the DATA lines shown in PRESS.DAT (LISTING 2), and run the resultant program.

Cheap LetterJet Refills

Soon after buying an Epson HS 80P-U LetterJet printer, I was shocked to discover that each \$9 ink cartridge (#8761), which con-

Key	Code
<Home>	HM
<End>	ED
<Page Up>	PU
<Page Down>	PD
<Insert>	IN
<Delete>	DE
<F1> through <F9>	F1 through F9
<F10>	F:
<Cursor Left>	LT
<Cursor Right>	RT
<Cursor Up>	UP
<Cursor Down>	DN
<Enter>	CR
<Esc>	ES

TABLE 1: PRESS.COM two-letter key codes.


```

10 DEFINT A-Z:CLS:KEY OFF:DEF FNHEX(X$)=VAL("&h"+X$)
20 MSG$="Now testing for data errors...please wait" : GOSUB 190
30 SUM=0:READ LN:IF LN<0 THEN 80
40 READ H$:IF VAL(H$)<0 THEN 70
50 IF LEFT$(H$,1)="*" THEN GOSUB 210 : GOTO 40
60 SUM=(SUM+FNHEX(H$))*2:SUM=(SUM\256)+(SUM MOD 256):GOTO 40
70 READ CKSUM$:IF (SUM MOD 256)=FNHEX(CKSUM$) THEN 30 ELSE GOTO 170
80 MSG$="Press any key except ESC to create "+F$+": "
90 GOSUB 190 : A$=INPUT$(1) : PRINT : IF A$=CHR$(27) THEN END
100 LOCATE 6,1:PRINT "Working...";
110 OPEN F$ AS #1 LEN=1 : FIELD #1,1 AS BX$
120 READ LN:IF LN<0 THEN 160
130 READ H$:IF VAL(H$)<0 THEN READ CKSUM$:GOTO 120
140 IF LEFT$(H$,1)="*" THEN GOSUB 240 : GOTO 130
150 LSET BX$=CHR$(FNHEX(H$)) : PUT #1 : GOTO 130
160 CLOSE:PRINT:PRINT F$;" has now been created.":END
170 PRINT:PRINT "Error in DATA line";STR$(LN);".";
175 PRINT:PRINT "SUM=";SUM
180 PRINT "Check your work.":BEEP:END
190 CLS : LOCATE 3,1 : PRINT "X-Maker II" : RESTORE : READ F$
200 LOCATE 5,1,1 : PRINT MSG$; : RETURN
210 ZZ=VAL(MID$(H$,2)) : FOR I=1 TO ZZ
220 SUM=SUM*2 : SUM=(SUM\256)+(SUM MOD 256)
230 NEXT : RETURN
240 ZZ=VAL(MID$(H$,2)) : FOR I=1 TO ZZ
250 LSET BX$=CHR$(0) : PUT #1 : NEXT : RETURN

```

LISTING 1: X-MAKER2.BAS, *.*'s program-making program

```

1000 DATA "press.com"
1010 DATA 1,E9,80,*129,33,-1,09
1020 DATA 2,C9,26,8A,0E,80,00,49,7E,32,BE,81,00,E8,3B,00,83,-1,CC
1030 DATA 3,F9,1E,76,03,B9,1E,00,BE,03,01,B8,40,00,8E,C0,BF,-1,C1
1040 DATA 4,1E,00,26,89,3E,1A,00,26,89,3E,1C,00,FC,51,F3,A4,-1,FC
1050 DATA 5,59,26,03,0E,1C,00,26,89,0E,1C,00,B8,00,4C,CD,21,-1,6B
1060 DATA 6,83,C7,02,83,C6,02,05,02,00,C3,BF,03,01,33,C0,33,-1,32
1070 DATA 7,DB,3B,C1,76,03,E9,DD,00,80,3C,22,75,05,E8,DC,00,EB,-1,F8
1080 DATA 8,EF,80,3C,7E,75,05,E8,E8,00,EB,E5,80,3C,46,75,05,-1,59
1090 DATA 9,E8,ED,00,EB,DB,81,3C,4C,54,75,09,C7,05,00,4B,E8,-1,4A
1100 DATA 10,BD,FF,EB,CC,81,3C,52,54,75,09,C7,05,00,4D,E8,AE,-1,36
1110 DATA 11,FF,EB,BD,81,3C,55,50,75,09,C7,05,00,48,E8,9F,FF,-1,A8
1120 DATA 12,EB,AE,81,3C,44,4E,75,09,C7,05,00,50,E8,90,FF,EB,-1,09
1130 DATA 13,9F,81,3C,48,4D,75,09,C7,05,00,47,E8,81,FF,EB,90,-1,89
1140 DATA 14,81,3C,45,44,75,09,C7,05,00,4F,E8,72,FF,EB,81,81,-1,DA
1150 DATA 15,3C,50,55,75,0A,C7,05,00,49,E8,63,FF,E9,71,FF,81,-1,1F
1160 DATA 16,3C,50,44,75,0A,C7,05,00,51,E8,53,FF,E9,61,FF,81,-1,5E
1170 DATA 17,3C,49,4E,75,0A,C7,05,00,52,E8,43,FF,E9,51,FF,81,-1,D9
1180 DATA 18,3C,44,45,75,0A,C7,05,00,53,E8,33,FF,E9,41,FF,81,-1,91
1190 DATA 19,3C,43,52,75,0A,C7,05,0D,00,E8,23,FF,E9,31,FF,81,-1,96
1200 DATA 20,3C,45,53,75,0A,C7,05,1B,00,E8,13,FF,E9,21,FF,46,-1,F8
1210 DATA 21,40,E9,1C,FF,81,EF,03,01,8B,CF,C3,46,40,80,3C,22,-1,4C
1220 DATA 22,74,0D,3B,C1,74,09,8A,1C,89,1D,83,C7,02,EB,EC,46,-1,A5
1230 DATA 23,C3,46,40,8A,1C,80,E3,1F,89,1D,83,C7,02,46,40,C3,-1,A8
1240 DATA 24,46,40,8A,1C,80,EB,30,7C,0E,80,FB,0A,7F,09,80,C3,-1,06
1250 DATA 25,3A,88,3D,47,88,1D,47,46,40,C3,-1,CF,-1

```

LISTING 2: Merge PRESS.DAT's DATA lines with X-MAKER2.BAS (LISTING 1) to create PRESS.COM using BASIC.

tains about 4 milliliters of fluid, lasted for only 25 to 30 pages in NLQ mode. At that rate, printing a few hundred pages would cost a small fortune, and I feared I had bought a white elephant.

After searching everywhere for an inexpensive replacement and rejecting several pen inks that were laced with lacquer to make them dry quickly, I hit upon the perfect solution: water-based Sheaffer Skrip jet black fountain pen ink. To make a device for injecting ink into the printer's reservoir, I cut off and rounded the tip of a syringe. Since then, I've been using my cheap refill ink regularly with no problems. Even when the printer sits idle for weeks, it prints without missing a dot. If you find another substitute ink, make sure it doesn't dry out or clog up under normal conditions.

The savings from this solution are terrific. A 60-milliliter bottle of Sheaffer ink costs about \$2. The equivalent 15 Epson cartridges would run a whopping \$135! I hope this tip will make other LetterJet owners as thrifty—and as happy—as I now am with my printer.

Roger D. Peugh

Winona Lake, Indiana

Editor's note: It's illegal in some states to purchase a hypodermic syringe without a prescription. But if you're on good terms with a local pharmacist or family physician, you may be able to obtain one without a needle. If not, look in a drugstore for a needleless infant's medicine syringe, such as the Apex Medical Corporation's Oral Syringe, which is sold over the counter. Veterinarians and pet supply stores also carry needleless syringes.

Our Nom de Plume, Perhaps?

I've discovered an alternative to this column's namesake, the familiar DOS wild-card specification, *.*. In most DOS commands, you can save two keystrokes by instead typing a plain period, which also means "all files in the current directory." For example, COPY A:. is identical to COPY A:*.*, and DEL . is the same as DEL *.*. (One caveat: In DOS versions before 3.0, the trick won't work in the root directory. There, you can use a backslash instead of a period.) Perhaps you should rename your column just plain Dot?

Steven Stewart

Moncton, New Brunswick,
Canada

*Editor's note: Technically, a single period stands for the name of the current directory. The trick works because DOS commands like DEL let you specify a directory name as a shorthand way to operate on all files in that directory. Its use, however, is not exactly equivalent to *.* and can cause damage. For example, issuing the command COPY . will not generate the error message 'File cannot be copied onto itself' but will instead cause files to copy onto themselves, destroying any that are larger than 64K. COPY does not recognize that .\filename and filename designate the same file.*

Another little-known shorthand reference is double dot (..), which represents the parent directory. Thus, the command DIR .. lists the files in the parent of the current directory, and DEL .. deletes them. As for our

name, we'll keep our lucky stars, but thank you very much.

No Runs, No Hits, No ERRs

In "To ERR Is Inhuman" [*Star-Dot-Star*, PCW, September 1988; see also "ERROR Correction," *Star-Dot-Star*, PCW, January 1989], Leon Chalnack describes a macro for eliminating 1-2-3 spreadsheet ERRs. Another method I've found helpful is to copy the statement @IF(@ISERR(formula),0,formula) down a column.

This returns zero in each cell if the formula evaluates to ERR; otherwise, it returns the result of the formula, which you can replace with any valid expression. The result can be used as an element in other calculations referring to the cell. Another technique is to use a similar statement to refer to a different cell. @IF(@ISERR(B5),0,B5) returns zero if B5, or any other specified cell, contains ERR, or the contents of B5 if it doesn't.

Dan Ayala

Palo Alto, California

Editor's note: To strip NA messages from cells, replace @ISERR with @ISNA.

DEVELOPER'S TOOLBOX

Conventional Surprises

Dozens of new and improved software tools sparkled brightly amid the glitz and glitter at Fall COMDEX in Las Vegas. There were a few surprises, too. For instance, John Otken, developer of the assembler Optasm, gave me an eye-popping advance look at his new linker, *Optlink*, and new debugger, *Optdebug*, which will

be available soon from SLR Systems. The debugger features a clever command that lets you work backward through a program, undoing the effects of previously executed machine code step by step. Other planned Optasm features include 80386 support, faster assembling speed, and teaser versions of *Optlink* and *Optdebug*, making this product worth serious consideration.

Speaking of assembly language, Bruce Barrington and Gary Liming of Clarion Software told me that programmers are now hard at work converting the Clarion language from Turbo C to pure assembly code. The finished effort should add an extra helping of speed and reduce disk space requirements for the company's easy-to-use, menu-driven data base-development systems. An impressive demo made clear to me that for getting data base applications up and running in a hurry, *Clarion* is a dream.

There were new tools for high-level-language programmers, too. Despite a feeding frenzy at a nearby bowl of Hershey's Kisses, I managed to follow a demo of a fascinating new program design tool, *Logic Gem* from Sterling Castle. The basic idea behind *Logic Gem* is simple. You plug in logical statements and select a language. Moments later, you receive a source code listing optimized for the decision rules you supplied. Output choices include C, structured BASIC (for example, Turbo Basic and QuickBASIC), interpreted BASIC, Pascal, FORTRAN, dBASE, and English (useful for documenting your code). The program is especially good at cutting through a complex forest (*continues*)

of nested decision trees, ensuring the logical consistency of multiple IF...THEN...ELSE statements. Serious programmers must get *Logic Gem*. It's a jewel.

Nonprogrammers who need to build DOS menus quickly should pick up *Menu Blocks* from Bridgeway Publishing. The product isn't new, but its well-designed character graphics commands make building custom menus fast and easy. (Another recommendation: The company makes *Fast-Trax*, a *PC World* Best Buy.) Also, because *Menu Blocks* maintains an internal PATH variable, using the program can eliminate PATH commands in AUTOEXEC.BAT and other batch files. For designing turnkey systems, *Menu Blocks* belongs in every developer's bag of tricks.

Likewise, for applying the finishing touch of on-line documen-

tation, all systems developers should be pleased with the features in new releases of *PDQ-Help*, a text-only version, and *PDQPlus*, which includes graphics support. These programs help build context-sensitive pop-up text files that can hold 100,000 keywords, with as many as 1200 lines of associated text per word. For personal programming references, you can order prepackaged files for Greenleaf C and Lahey FORTRAN tool kits. And you can freely distribute a supplied *PDQHelp* run-time module for adding on-line documentation to your own software. Best of all, *PDQHelp*'s resident module occupies a thrifty 29K. *PDQPlus* takes up only 39K. If you're seeking an on-line help system, look no further.

Discovering these and other tools at COMDEX meant hiking an estimated 36 total miles of aisles at eight locations, but I'm glad to say the trip was worth every step. New developer's tools promise an exciting future for software and systems designers. What's more, my research provided an unexpected health benefit—with all that walking, I lost three pounds! —T. S.

Tom Swan is the author of Mastering Turbo Pascal 4.0 (Howard W. Sams, Indianapolis, Indiana, 1988) and the forthcoming Mastering Turbo Assembler (Howard W. Sams).

To send correspondence or to submit material for publication in this column, please see How to Contact PC World, page 4. ●

WHERE TO BUY

Clarion Personal Developer

Clarion Software
150 E. Sample Rd.
Pompano Beach, FL 33064
800/354-5444,
305/785-9172 (BBS)
List price: \$169
Requirements: 512K,
DOS 2.1 or later version
Not copy protected
Technical support:
no toll-free number,
M-F 8:30-5
Other support services: 24-hour BBS
(300/1200/2400 bps)
For more information,
circle 630 on reader
service card.

Clarion Professional Developer

Clarion Software
List price: \$695
Requirements: 512K,
DOS 3.1 or later version

Not copy protected
For more information,
circle 631 on reader
service card.

Logic Gem

Sterling Castle
702 Washington St. #174
Morino del Rey, CA 90292
800/722-7853,
800/323-6406 California,
213/453-7705 (BBS)
List price: \$198
Requirements: 640K,
DOS 2.0 or later version
Not copy protected
Technical support:
free, unlimited, no toll-free
number, M-F 9-5
Other support services: 24-hour BBS
For more information,
circle 632 on reader
service card.

Menu Blocks 2.0

Bridgeway Publishing
Corp.
2165 E. Francisco Blvd.
#A1
San Rafael, CA 94901
415/485-0948
List price: \$79.95
Requirements: 16K
(with Help System loaded),
DOS 2.1 or later version
Not copy protected
Technical support:
free, unlimited, no toll-free
number, M-F 8-5
Other support services: none
For more information,
circle 633 on reader
service card.

Optasm

SLR Systems
1622 N. Main St.
Butler, PA 16001
800/833-3061,
412/282-0864

List price: \$125

Requirements: 128K,
DOS 2.0 or later version
Not copy protected
Technical support:
free, unlimited, no toll-free
number, 9-5 M-F
Other support services: BBS
412/282-2799, BIX
For more information,
circle 634 on reader
service card.

Optdebug

SLR Systems
List price: \$125
Requirements: 256K,
DOS 2.0 or later version
For more information,
circle 635 on reader
service card.

Optlink

SLR Systems
List price: \$125
Requirements: 256K,
DOS 2.0 or later version
For more information,
circle 636 on reader
service card.

PDQHelp

Leverage Software
6601 Little River TnPk.
#400
Alexandria, VA 22312
800/344-2322,
703/642-0818
List price: \$59.95
Requirements: 29K,
DOS 2.0 or later version
Not copy protected
Technical support:
unlimited, free, toll-free
number, M-F 9-5
Other support services: none
For more information,
circle 637 on reader
service card.

PDQPlus

Leverage Software
List price: \$295
Requirements: 39K,
DOS 2.0 or later version
For more information,
circle 638 on reader
service card.

How Farsighted Executives Are Using Their PC's For The Fun Of Profit.

By William J. Spink

For years now you've been hearing about the wonderful things personal computers will do for The Executive of the 80's—at least in theory.

But what's the *reality*? Can a PC help you enjoy your work more and show a greater profit, here and now? According to your peers, the answer is "yes."

"With just a few keystrokes," says Al Lynch, Director of Corporate Planning and Research for JCPenney Company, "I can screen companies, find possible acquisitions or 'scope-out' competitors. It's a real competitive edge."

Walt Casey, V.P. of Communications at ConAgra says, "I spend a lot of time each day poking into this and tracking that. It's *much* easier when you can immediately get the facts from a computer, rather than having to make a series of phone calls."

"One of Dow Jones News/Retrieval's services, QuickSearch, is a Godsend," adds Jim Posner, a respected retail consultant. "It gives me detailed corporate reports within minutes—I don't even have to leave the office."

Instant information: the executive advantage.

To lead in today's marketplace, you need information like *that*," Lynch says, snapping his fingers.

He recalls an example of how Dow

Jones News/Retrieval®—the business and financial information service from Dow Jones & Company, Inc.—gave JCPenney Company a real advantage.

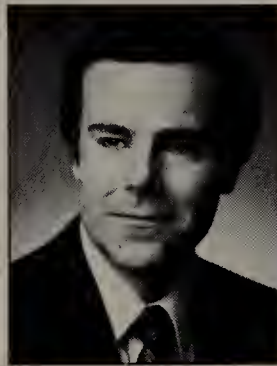
"Let's just say that a 'major player' in our industry was being acquired. Within a few hours we knew more about the take-over candidate than the bidder did. Honestly, we knew more than some investment bankers did."

Decision-making with the leading edge.

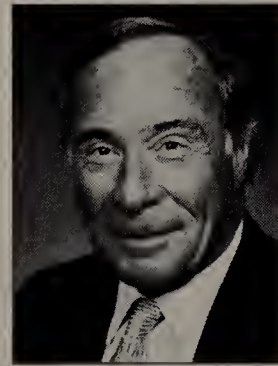
"Then we started getting the corporate insider trading data," Lynch continues. "It showed us some things that influenced a major deal."



Al Lynch
Director of Planning
and Research,
JCPenney Co.



Walt Casey
Vice President,
Corp. Communications,
ConAgra, Inc.



James Posner
President,
James Posner
Assoc. Ltd.

"This service really makes a difference in the day-to-day running of your business. It can pay for itself very quickly."

Surprisingly easy.

All you need to access the service is a PC and modem. Using the service is

What can you get from your PC? Dow Jones News/Retrieval gives you...

- Exclusive online access to the full text of *The Wall Street Journal*
 - Current and historical stock quotes
 - Business news as it happens
 - 10-K and 10-Q data
 - Leading investment analysts' reports
 - Complete corporate profiles
- Over 40 services including MCI Mail®, the Official Airline Guide™ and more.

"No problem," according to Posner.

"There's no difficulty using the service. I ask for pointed, specific information and get exactly what I need. It's much easier than manual research."

Walt Casey agrees. "Dow Jones News/Retrieval is simple enough for anyone who's at all comfortable with computers to use it effectively from their very first day online."

Making the right decision.

There are hundreds of online information services, many offering business data. How can you pick the best one?

"It was apparent from the first step that the most useful system was Dow Jones News/Retrieval," remembers Casey. "It offers so much of the information you're looking for—from general news and stock quotes, to data on our company and industry. It was the best single source."

"I've had other services, but Dow Jones News/Retrieval has the most useful business information in the right form," says Posner. "The time I spend 'playing' on the computer makes more money for me—and for my clients."

Now that's the *fun* of profit! ■

Get 8 FREE hours online to experience the "fun of profit" on your PC.

YES, I'm ready to experience the fun of profiting from my PC. Send me a Dow Jones News/Retrieval® Business Membership Kit, including multiple passwords, 8 free* hours of online time, a year of *Dowline*™ Magazine, a comprehensive User's Guide and waiver of my first year's annual \$18 service fee—for only \$49.95.

☐ \$49.95 Business Membership Kit

☐ Bill me later

☐ Charge to my AmExp

Acct.# _____ Exp. _____

If you pay by credit card, future charges will be billed to that account.

Signature(required) _____

☐ Check enclosed

Name _____

Title _____

Company _____

Address _____

City/State/Zip _____

Daytime phone _____

Computer make and model _____

☐ Please send more information.

For faster service, call 1-800-221-7700, Ext. 109C today!

DOW JONES NEWS/RETRIEVAL®

From Dow Jones & Company, Inc.

The information that powers today's business.™

DJN/R Membership Kit, P.O. Box 186, Drexel Hill, PA 19026-9973

109 C

This offer expires March 31, 1990. *Free time is per account. New domestic and Canadian subscribers only. Free time must be used within 30 days after receipt of password(s). Some additional fees may apply on certain services. ©1988 Dow Jones & Company, Inc. All rights reserved. MCI Mail is a registered service mark of MCI Communications Corp. The Official Airline Guide is a trademark of Official Airline Guides, Inc.

VGA.

The monitor game has changed, but the leader hasn't. It's still Amdek.

Marbles. Remember? That's what real color looked like under glass. On new Amdek VGA™ monitors—it still does.

We know. The independent leader in monitors when there was only one color on the screen, is still the leader when it comes to a choice of 262,144 colors.

Amdek now offers the largest line of VGA monitors in the business. With higher image

quality. Vibrant color. Sharp resolution. Better design. And, lower cost.

VGA is today's smart choice, because it's fast becoming tomorrow's standard. Amdek offers the broadest selection: the 432, with paper white or amber screen; 632, with low-cost 14-inch color screen; 732, with high-resolution 12-inch color screen; and, SMART SCAN™ 735, switchable to virtually all color graphics standards.

If you want to see clearly and in color what your computer's saying, go for all the marbles.

Knuckle down with Amdek. For a free "See The Difference Brochure" on VGA call 1-800-PC-AMDEK.



 **AMDEK**

Amdek is a registered trademark. Monitors/432, 632, 732, 735 and SMART SCAN are all trademarks of Amdek Corporation. VGA is a registered trademark of International Business Machines Corporation.



NETWORK Q & A

Tips and strategies for departmental networking

PC World launches a new column devoted to LAN users and asks the question, What network operating system is right for you?

David
Ferris

Communication is the bedrock of business success. Fail to listen to your customers, and you'll quickly find yourself staring at a shriveled bottom line. Fail to communicate in your department, and projects can quickly run aground. To keep work groups and companies in sync, more and more businesses are turning to local area networks.

Yet there's no productivity gain without pain. For most people, linking PCs together into even a small LAN can be a titanic challenge. Just deciding what to buy can keep you up nights: Should I go with Novell or 3Com? Should I opt for ethernet or token ring adapter cards? Can I use a Deskpro 386 for a server? Must I run multiuser software, or will single-user applications do? And what about integrating PCs, Macs, and Wangs on a growing network? Or linking up to a LAN on the third floor or the VAX across the hall?

Network Q&A is designed to answer just such real-world questions from readers. Each month the column will provide nitty-gritty guidance on selecting LAN hardware and software, help readers unravel network snafus, and supply tips for efficient day-to-day operation. Beyond this, *Network Q&A* will report on new products and trends and shed some light on new technologies.

Network Q&A should be useful to anybody involved with LANs, whether you're a novice

user wondering how to work with a shared laser printer, or an experienced MIS pro evaluating new server technology. However, the column is aimed primarily at first-time LAN administrators of small to medium-size networks, and the managers who work with them.

The column's main charter is to answer your questions. Send your queries to *Network Q&A*, *PC World*, 501 Second St., San Francisco, CA 94107, or electronically to MCI Mail PCWORLD/179-3813. If your question is published, you'll receive \$25.

Q. What type of LAN operating system should I buy?

A. By far the most crucial decision you'll make in selecting a network is the choice of a LAN operating system (LAN OS), the software glue that holds a network together. The leading LAN OS products are Novell's *NetWare*, 3Com's *3+*, Sun's *TOPS*, Banyan Systems' *Vines*, and numerous versions of Microsoft's *OS/2 LAN Manager*. Your choice of LAN OS should be guided by what the network will have to do immediately—and over the next three or four years.

Choosing the right LAN OS is critical for two reasons. First, like any operating system, a LAN OS defines a network's
(continues)

character and how easy it is to configure, learn, use, and upgrade. Second, changing your LAN OS is extremely difficult, much trickier than changing wiring, adapter cards, or servers. Switching to a new LAN OS not only involves reinstalling all your applications and resetting user access rights but can mean redesigning front-end menu systems, and more. Imagine switching every PC in your office from DOS to UNIX, and you get the idea.

A LAN OS is a must because DOS doesn't know much about sharing printers, modems, storage, and other resources. The LAN OS controls access to these resources and to data and programs on the server. Depending on the LAN OS, directories can be public (open to all users), shared (open to a select group), or private (assigned to one person). The LAN OS also directs traffic, queuing (or "spooling") print requests from networked users. You can expect a LAN OS to come with utilities such as an E-mail program for exchanging short messages within the department, programs that monitor usage, and so on. Before you buy that dream LAN OS, however, consider some other key factors:

Software Compatibility Before you buy a LAN OS, make sure it supports the *multiuser* applications you want to use. Don't be lulled by a vendor's claim that its LAN OS will run almost any *single-user* program off the shelf. Insoluble incompatibilities can crop up; more to the point, single-user programs lack basic file- and record-locking safeguards. If two people try to open the same file, the entire network can crash. For the surest answer

on LAN OS compatibility, contact the company that sells the multiuser package.

NETBIOS Compatibility Make sure the LAN OS is NETBIOS compatible; these standard networking subroutines are used by many important multiuser applications. Most major vendors support this specification, but it never hurts to ask.

Training If you thought DOS was unfathomable, try using a LAN OS. Logging on to the server, sending an E-mail message, and performing other day-to-day tasks can mean typing reams of obscure commands. To shield users from technical intricacies, your technical staff (or consultant) should create a menu system and convenient batch files, write relevant user documentation, and then give everyone a quick tutorial on using the LAN.

Technical Support Don't base your choice of a LAN OS solely on its price tag. Technical support can be a huge expense; remember, too, that it's easier to find qualified staff for some LANs because of their popularity. If you're running a small TOPS network, you may not need much help. But chances are you'll need some in-house staff as well as third-party consultants, LAN resellers, and LAN OS vendors to maintain multiuser software, develop front-end menu systems, and tackle other thorny tasks. In sum, determine the level of post-sale support you'll want—and the LAN OS's popularity—before choosing a network supplier.

Memory Requirements Find out how much RAM the LAN OS commandeers from networked PCs—you may have to upgrade

some machines. *NetWare* and *3+* usually require that each PC cede from 30K to 70K. TOPS, which lets any PC be a workstation, server, or both, takes more: If a PC acts as either workstation or server, the RAM cost is 120K. If it plays both roles, say goodbye to 190K. Don't forget that menu systems and drivers for LAN adapters also soak up memory.

Security Need to protect payroll records from prying eyes? Should certain employees be allowed to read records but not edit them? If you need this level of control, carefully consider a LAN OS's security features. At the very least, the system should control access to files and records and require users to enter passwords when logging on. LANs that can link to the outside world (remote users, other LANs, and large systems) should safeguard access to modems, fax gateways, and micro-to-mainframe links.

When evaluating security features, keep convenience in mind. *3+* and TOPS users must enter a password for each shared resource (printer, modem, or server) they access. This approach becomes annoying as a LAN grows in size. With *NetWare*, on the other hand, a single password controls access to all peripherals. *NetWare* can also detect and record unsuccessful log-ons, and automatically force users to change passwords at set intervals.

Lay of the LANs

When selecting your LAN OS, it's crucial that you examine how the network will be used. Most networks fall into three categories—personal LANs, isolated work-group LANs, and power

LANs. Determine which category your LAN falls into and then judge how well a given LAN OS meets its needs.

Personal LANs are limited to ten or fewer PCs and are set up primarily for sharing peripherals and data. Users in a work group can share a printer, swap messages via a basic E-mail program, and move data files over the network. If your LAN fits this profile—and you don't expect it to grow much—TOPS is probably the best choice (see "TOPS—The Low-End Link to Macs" in this issue). Although TOPS can cost as much as an equivalent *NetWare* setup (about \$500 per node), TOPS is much easier to install and use. In addition, it offers the flexibility of *peer-to-peer networking*: Instead of relying on a single dedicated server that holds all shared files and controls all shared peripherals, TOPS lets any node act as server or server/workstation. This scheme allows shared hard disks and peripherals to be situated throughout the office. TOPS's Achilles' heel? Its limited password-based security and lack of centralized administration tools—critical features if the LAN has to grow.

Isolated work-group LANs are typically single-server setups that support between 10 and 40 PCs, supply considerably more services than personal LANs, and aren't linked to other networks. Typical needs include centralized backup, multiuser data bases, sophisticated E-mail, and a shared library of numerous file types. Although it's tricky to install, *NetWare* is currently the best option in this category, and its popularity assures you of

finding plenty of support software and knowledgeable technicians to tune up the system.

3Com's *3+* can also serve isolated work groups, but it's not as widely supported and may come with more extras than you want. Versions of *LAN Manager* such as IBM's *LAN Server* and 3Com's *3+ Open* are also viable options. As more vendors deliver supporting software, these products will become increasingly attractive.

Power LANs are rich multi-user environments that meld hundreds of workstations with other LANs, remote users, and mainframes near and far. 3Com's *3+* and *3+ Open* are good bets for power LANs. They streamline internetwork communications and let users access remote servers and peripherals as if they were across the room. The key underpinnings are a *name service*—a distributed system directory that coordinates multiple servers—and *internetwork routing*—a facility that optimizes data exchange with remote LANs.

Banyan's *Vines* is another candidate if you need foolproof security, powerful debugging tools, and top-of-the-line internetwork routing. However, you're on your own for installation and maintenance because vendor support is sparse, and third-party services and applications are few and far between.

Take your time evaluating a network operating system; the success of your LAN—and your department's productivity—will depend on it. Above all, avoid choosing your LAN OS based on a quick poll of what other firms use on their LANs. That approach can be a recipe for disaster. ●

David Ferris is president of Ferris Networks, a San Francisco-based reseller of network products whose services include systems configuration, installation assistance, training, and maintenance contracts. He has worked with PC networks since 1979 and has installed LANs from IBM, Novell, 3Com, and Microsoft at a number of major U.S. corporations.

To send correspondence, please see How to Contact PC World, page 4.

POWER TIP NO. 40

Spell Out dBASE Logical Fields

Tired of explaining what T and F stand for in *dBASE III Plus* reports? If your *dBASE* reports often display the contents of logical fields, you'll produce more readable output by using *dBASE's* *IIF()* function with the Active expression to substitute words for the logical values.

Suppose you have a file called *Vendors* with a logical field, called *Active*, containing T or F. In a report column, instead of the Active expression itself, use *IIF(Active, "Yes", "No")*. You can also use *IIF(Active, "Active", "Inactive")*.

Alan Schwartz
San Francisco, California

CATALOG

PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

HARDWARE

■ Accessory Boards	page 221
■ Communications/Modems	page 221
■ Computers/Systems	page 221
■ Disk Drives	page 222
■ Expansion Units	page 223
■ Insurance	page 222
■ Memory Chips	page 222
■ Peripherals	page 223
■ Plotters	page 224
■ Security	page 224

MISCELLANEOUS

■ Accessories	page 224
■ Bar Coding	page 225
■ Business Opportunities	page 225
■ Catalogs	page 225
■ Computer Insurance	page 226
■ Data/Disk Conversion	page 226
■ Disk Copy Service	page 226
■ Disks	page 226
■ Networking	page 227
■ Supplies	page 227
■ Typesetting	page 228

SOFTWARE

■ Accounting	page 228
■ Business Applications	page 228
■ Church Applications	page 230
■ Communications	page 230
■ Construction	page 231
■ Data Base	page 231
■ Data Entry	page 231
■ Desktop Publishing	page 231
■ Educational	page 232
■ Engineering	page 232
■ Entertainment/Games	page 232
■ Financial	page 233
■ Foreign Languages	page 234
■ Flow Charting	page 234
■ Genealogy	page 234
■ Graphics	page 234
■ Health	page 235
■ Inventory Control/Management	page 235
■ Laser Fonts	page 235

■ Legal	page 235
■ Mailing List Programs	page 235
■ Maintenance Management	page 236
■ Manufacturing	page 236
■ Medical	page 236
■ Music	page 236
■ Public Domain/Shareware	page 237
■ Real Estate	page 237
■ Sales/Marketing	page 238
■ Security	page 238
■ Statistics	page 238
■ Surveys	page 239
■ Taxes	page 239
■ Terminal Emulation	page 239
■ Time Management	page 240
■ Utilities	page 240
■ Weather	page 240
■ Word Processing	page 240

ADVERTISING SALES STAFF

Sharon Van Leuven
Catalog Manager

Eric Cressy
Western U.S.

Deborah Tarantino
Eastern U.S.

Place Your Ad Today!
Call 800.435.7766
In CA: 800.435.7760

ADVERTISING RATES & INFORMATION

The *PC World Catalog* serves as a cost-effective monthly meeting place for advertisers and volume purchasers. Our readers don't want to shop, they want to buy! And your message can reach them in two formats—display or text. Both are arranged by product category for easy reference.

Display ads are sold by the column-inch (2-inch minimum). You must supply camera-ready type and artwork. Standard red is available as a second color.

Text ads are sold at a minimum three-time rate of \$430 per issue for a total of \$1,290. You supply copy. We set type.

For further information regarding the *Catalog*, space closings and material deadlines, please call Toll-Free 800/435-7766. Within California, call 800/435-7760.

PC World
501 Second Street
San Francisco, CA 94107

PcW PCW Communications, Inc.
An IDG Communications Publication

CATALOG G

Shop The PC World Catalog for fast solutions to your PC needs.

HARDWARE/Accessory Boards



Connect with ARCnet™

* Top Quality * Tested by Novell * One Year Warranty

ARCNET CARDS AND HUBS
ETHERNET CARDS
STANDARD AND PS/2 BUSS
CABLES AND CONNECTORS
NETWORK OPERATING SYSTEMS
UTILITIES
MULTIUSER SOFTWARE

Network Support Corporation

Local Area Network Distributors
3701 Kirby Drive, Suite 1110, Houston, TX 77098
(713) 521-1211

"this board functions exactly like the card available from Novell"
[Novell, Inc. Test Bulletin]

CIRCLE 590 ON READER SERVICE CARD

STOP DON'T TURN OFF YOUR PC!

HDS100 HARD DISK SAVER is a 1/2 card capable of turning on and off the hard disk under software control while maintaining continuous use of the computer.

- 50% noise reduction
- Reduced risk of hard disk failure
- Up to 20% power savings

Introductory offer... \$79.

Plus S + H - CA res. add 7%
MADE IN U.S.A.

- Your RAM resident programs accessible at all times
- Screen saver included
- Fax/modem cards operable 24 hours

P.O. BOX 1496 • Union City • CA 94587
(415) 471-3849

GANDER/TEKNICAL

CIRCLE 454 ON READER SERVICE CARD

TOSHIBA LAPTOPS

T1000	\$759.99
T1200F/FB-	\$1329.00/1499.00
T1200H/HB-	\$2199.00/2399.00
T3200	\$3640.00
T5100	\$4649.00
SANYO LAPTOP	\$995.00

PANASONIC FAX MACHINE

PANAFAX UF 155	\$1095.
PANAFAX UF - 250	\$1495
PANASONIC KXF120	\$1095
Sanyo SF 600 Copier	\$545

\$385.00

MACHINE

FAX

MURATA MI/1200/	\$645/695.00
RICOH 800/20	\$799/1495
CANNON 20/8	\$1075.00/799
SHARP FO 220/420	\$945/1195
SANYO SF100/200	\$995/1195
SANYO SF 515H	\$1495.00
TOSHIBA TF211	\$1495.00

Terms: Prepayment Prices Visa M/C COD + 2% Restock 20% prices can change.
T.P.C. 12603 Hoover St. Garden Grove, CA 92642

Rent *Buy *Lease **800-444-3199** Fax 714-891-1202

CIRCLE 591 ON READER SERVICE CARD

NEW! BIGMOUTH™ VERS. 2.0

REAL VOICE Digital Recording for your PC, XT, AT or Compatible

- ◆ VOICE MAIL SYSTEM
- ◆ TELEMARKETING - Inbound & Outbound
- ◆ SMARTEST ANSWER MACHINE
- ◆ AUTODIAL-DATABASE
- ◆ VOICEPAD™ - Voice for your Programs
- ◆ PROGRAMMER'S TOOLKIT (optional \$79.00)

1/2 card, software, cables, & speaker

\$269.00 + 5 s/h

(415) 652-9600

Talking Technology, Inc.
4383 Piedmont Ave. Suite B
Oakland, CA 94611

CIRCLE 521 ON READER SERVICE CARD

Communications/Modems

COMPFAX, INC.

CHIPS - All Speeds

64K	Call
256K	Call
Processors-Intel	Call

SHARP FAX MACHINES

FO 220	\$ 969.00
FO 420	\$1269.00

FAX PAPER AVAILABLE

DIGITIZERS

Summasketch/Plus \$339.00

TOSHIBA LAPTOPS

call for prices

"We Are The CHEAPEST"

2323 James Ct., Arlington Hts., IL 60004
Nationwide - 1-800-243-7775
Illinois - 312-394-3334

CIRCLE 588 ON READER SERVICE CARD

Computers/Systems

Name Brands ★ Low \$\$

EXPANSION BOARDS

AST Sixpackplus (64-384K)	\$129
Advantage (128k-1.5M)	\$249
Advantage2 386 for PS2 80 W/Ok	\$429
Rampage (Ok-2M)	\$189
Rampage 286 (512k-2M)	\$409
Rampage2 286 for PS2 50/60	\$call
Intel Above 286 XT/AT (512k-2M)	\$379
Above PS 286 (512k-2M)	\$409
Above Board 2 for PS2 50/60 (Ok-2M)	\$275
Inboard 386 PC (1M)	\$call . AT (ok) . \$949
Quadboard (0-384k)	\$129

GRAPHICS CARDS

HERCULES Mono: \$189; . . . ATI EGA . . . \$189
QUAD Prosync: \$219; . . . VEGA Dix . . . \$219

HARD DRIVES

MINISCRIBE Kits. from 20mb.....	\$289
PLUS Hard cards from	\$539
MEMORY.64k, 256k, 1MB, Simms Modules	\$call
FLOPPY DRIVES: Toshiba for	
PC, AT: \$89; 1.2MB: \$99; 3.5":	\$109
External 5-1/4" drives for PS2.....	\$call
COMPUTERS. . . AST, SAMSUNG	
Tape Backup. . . Maynard, Everex	

VLM Computer Electronics

10 Park Place, Morristown, NJ 07960
(201) 267-3268*Visa, MC, Check or COD

Radio Shack Tandy

COMPUTERS
PRINTERS
CELL-PHONES
FAX-UNITS, etc.

SHOP AROUND BUY HERE

NATIONAL

COMPUTER WAREHOUSE CLUB

1200 HWY 377, GRANBURY, TX 76048
Cust. Serv.: (817) 573-0220

800-433-SALE
(24 Hrs. FAX: (817) 573-0227)

CIRCLE 458 ON READER SERVICE CARD

Radio Shack Tandy®

Our 12th year of DISCOUNTS
COMPUTERS &
CELLULAR PHONES
Fgt. Prepaid. Save Tax
Toll Free 800-231-3680

We will meet or beat . . .
GUARANTEED LOWEST PRICES

MARYMAC INDUSTRIES INC.

22511 Katy Fwy.
Katy (Houston) TX 77450
1-713-392-0747 FAX (713) 574-4567

CIRCLE 563 ON READER SERVICE CARD

IBM PS-2 MODEL 50/21	\$2675	APPLE MAC PLUS	\$1475
30 02/30 21	\$1265/\$1695	MAC SE / MAC SE-20	\$2275 / \$2875
60 40/60 70	\$3390/\$3725	MAC II / MAC II-40	\$3575 / \$3975
80 40/80 70/80 70	\$4375 / \$4875	IMAGewriter II	\$425
8503/8512	\$185 / \$435	EPSON LX-800	\$185
COMPAQ 286/1	\$1675	FX-850 / 1050	\$335 / \$485
386-60/386-130	\$5565/\$7045	LQ 500 / 850	\$329 / \$525
PORT II-2/II-4	\$1875/\$2775	LQ 1050 / 2500	\$719 / \$809
PORT III-20/III 40	\$3635/\$4145	SHARP PC-4501	\$629
H.P. LASER JET II	\$1675	PC-4502 / 4521	\$1135 / \$1895
DESK JET / 7475A PLOTTER	\$685 / \$1275	PC-7000A / 7100	\$1285 / \$1895
TOSHIBA T1000/T1200	\$745 / \$2225	PC-7202 / 7221	\$1895 / \$2520
3100 20 / 3200	\$2995 / \$3525	SHARP FAX MACHINES	
AST 286-80	\$1615	FO 220 / FO 300	\$999 / \$1175
286-120 / 286-140	\$2250 / \$2600	FO 420 / FO 500	\$1295 / \$1465
386-300 / 386-340	\$3470 / \$3920	TOSHIBA FAX 30100	\$1075

F2C, Inc. • 818/901-9662 • VISA/ MC Prices subj to change

CIRCLE 463 ON READER SERVICE CARD

CATALOG

PC WORLD

Shop The PC World Catalog for fast solutions to your PC needs.

PRICE UPDATE

Tandy
COMPUTERS AND PRINTERS etc.

Radio Shack
CELLULAR TELEPHONES FAX MACHINES etc.

IN 30 SECONDS

1-800-433-SAVE
CUST SERV (817) 573-4111
24 hrs. FAX: (817) 573-SAVE

FORT WORTH COMPUTERS
377 PLAZA, GRANBURY, TX 76048

CIRCLE 455 ON READER SERVICE CARD

WYSE 286/386 systems

2108 - 8.0 MHz 286 / 512k \$ 1839
2112 - 12.5 MHz 286 / 1 mb ram \$ 2365
3216 - 16.0 MHz 286 / 1 mb ram \$ 3395
Great looking, speed switchable, top quality

Ask about 25 MHz 386's, and multi-user systems.

PGI Systems
485 E. 17th, Suite 201 - Costa Mesa, CA. 92627
(714) 722-6562

All systems w/40 MB hard drive - add \$210 for 70 MB

ALR *authorized dealer*

10.0 MHz 286/512k ram \$ 2069
12.5 MHz 286/512k ram \$ 2279
20.0 MHz 386/1 mb ram \$ 3535
Special • w/30 MB hard drive - mono ... \$ 2095

TATUNG 286,640k,1.2mb floppy,kybd,DOS
8 MHz-\$1955 - 10 MHz-\$2055 - 12.5 MHz-\$2240

CIRCLE 515 ON READER SERVICE CARD

Tandy® Computers

Cellular Phones & FAX

Best Prices Best Service

1-800-633-0197

Ks. Res. & Cust. Serv.
1-913-364-2171

The Cisum Company
400 Pennsylvania
Holton, Ks 66436

CIRCLE 482 ON READER SERVICE CARD

Insurance



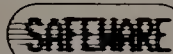
Sure it's insured?

SAFWARE® Insurance provides full replacement of hardware, media and purchased software. As little as \$39/yr. covers:

- Fire • Theft • Power Surges
- Earthquake • Water Damage
- Auto Accident • No lists of equipment required

For information or immediate coverage call:

1-800-848-3469
On CompuServe, GO SAF



SAFWARE, The Insurance Agency Inc.

CIRCLE 517 ON READER SERVICE CARD

Memory Chips

MEMORY CHIPS

256K 64K

64Kx4 256Kx4

Genuine Intel® IMEG

8087 80287

80387-25Mhz

In the box with manual and warranty

ESSKAY

718-353-3353

CIRCLE 471 ON READER SERVICE CARD

DYNAMIC RAMS

SIMM	80/100	\$CALL
1MBIT	100ns	\$33.00
514256	100ns	\$37.00
41464	150ns	\$14.50
41256	120ns	\$11.95
41256	150ns	\$10.15
51258	100ns	\$12.25
4164	150ns	\$ 2.85

PROCESSORS	PRICE	PROCESSORS	PRICE
80387-20 20MHz	\$465.00	27C101 250ns	\$ 23.00
80387-16 16MHz	\$390.00	27C512 200ns	\$ 15.00
80287-10 10MHz	\$252.00	27S12 250ns	\$ 9.50
80287-8 8MHz	\$218.00	27C256 250ns	\$ 5.50
8087-1 10MHz	\$184.00	27256 250ns	\$ 4.95
8087-2 8MHz	\$142.00	27128A 250ns	\$ 5.25
8087 5MHz	\$ 97.00	27C64A 200ns	\$ 4.95
V-30 8MHz	\$ 12.75	2764 250ns	\$ 3.50
V-20 10MHz	\$ 15.00	43256 120ns	\$19.95
V-20 8MHz	\$ 8.50	4364 150ns	\$13.50

I.C. EXPRESS

15358 Valley Blvd. City of Industry, CA 91746 Tel. 818-369-2688
ORDER TOLL FREE (Mon-Fri 8-5 PST)
(800) 892-8889 • (800) 882-8181
outside california
CALL FOR CURRENT PRICES & VOLUME DISCOUNTS
Price Shown for cash. MasterCard/Visa add 3%. Prices are subject to change.
Minimum order \$10.00 Shipping & Handling. UPS Ground \$5.00 Air \$7.00 (1 lb.)
ALL MERCHANDISE IS 100% GUARANTEED WITH PROMPT DELIVERY.

CIRCLE 492 ON READER SERVICE CARD

Disk Drives

DISC DRIVE REPAIR SPECIAL

SPECIAL COUPON

Capacity	Flat Rate	SPECIAL
10-14mb	\$75	
15-19mb	\$99	
20-30mb	\$125	\$112.50
31-40mb	\$150	\$135.00
41-49mb	\$175	\$157.50
50-85mb	\$210	\$189.00
86-120mb	\$275	\$247.50
121-150mb	\$325	\$292.50
Test & Evaluation	\$25	

VALID THROUGH 2/15/89

We repair most major brands of both hard and floppy disc drives

90 day warranty on all repairs. 5 day turn-around time.

FLOPPY DRIVE REPAIRS
CAPACITY FLAT RATE
180k-500k \$35
501k-1.2mb \$45

We have an extensive inventory of disc drives.

jb TECHNOLOGIES, INC.
21011 Itasca St. - #F
Chatsworth, CA 91311
Telephone (818) 709-6400

CIRCLE 486 ON READER SERVICE CARD

Did You Hear Who's Easy?

megamate

— easy to use, easy to install, and easy on the wallet. **Megamate** is the 3.5 inch 1.4 MB drive you can add to any PC/XT/AT.



\$349

- Installs in just minutes.
- Handles any 3.5 inch IBM disk, 720 KB or 1.4 MB automatically.
- Complete – drive, card, software.
- Attractive and compact, barely bigger than a diskette.

MicroSolutions
Computer Products

132 W. Lincoln Hwy
DeKalb, IL 60115
815.756.3411

CIRCLE 536 ON READER SERVICE CARD



Easy to install 3.5" floppy drive!

If you can't install this complete PS/2 compatible 3.5" external drive kit you have 30 days to return it for a refund. It supports 720K & 1.44MB floppies in an IBM PC, XT, or AT. (Card slot required.) Just \$299+\$6 S&H. Our internal drive kit isn't as easy, but it sells for \$259+\$6 S&H.

Blue Heron 1108 S. 2nd St. DeKalb, IL 60115 (815) 758-2355

CATALOG

PC WORLD

Shop The PC World Catalog for fast solutions to your PC needs.

Disk Drives



COREL Optical WORM Drives

- 100% PC COMPATIBLE
- "PLUG & PLAY SYSTEMS" - Drive, COREL Software, Cable, Card & Manual
- PROVEN HARDWARE - Drives by: Panasonic, Ricoh, Maxtor, Cherokee
- OPTIONAL DEVELOPERS KIT - For developers with special applications
- OTHER SYSTEMS AVAILABLE - Novell, Macintosh, 3COM, UNIX

COREL PC 400 (2x200 Mbyte)	\$2,895 (Cartridges \$99)
COREL PC 600 (2x300 Mbyte)	\$3,795 (Cartridges \$180)
COREL PC 800 (2x400 Mbyte)	\$3,995 (Cartridges \$160)

COREL, 1600 Carling Ave., Ottawa, Ontario K1Z 8R7, (613) 728-8200

CIRCLE 496 ON READER SERVICE CARD

Expansion Units

640K On MotherBoard

640K RAM without using an expansion slot. Upgrades allow easy insertion of 256K chips on system board. Highly reliable due to reduced heat & chip count. 100% comp. 30-day \$ back gtd, 2-yr wrnty. COMPAQ Portable, Zenith151,161: \$29 + memory; IBM XT, Portable & 3270: \$39 + memory; IBM PC: \$49 + memory. Call for current memory prices. \$4 s/h. Site discount, dealers welcome. *Aristo Computers, Inc.*
6700 SW 105th Ave. #307-J
Beaverton, OR 97005
503/626-6333, 800/3ARISTO'

Peripherals

SAVE ON

9 TRACK TAPE SYSTEM

FOR IBM PC/XT/AT



- Mainframe to PC Data Transfer
- High Speed Backup
- All Software, Complete System
- Service and Support, easy Installation

call (818) 343-6505 or write to:
Contech Computer Corp.
P.O. Box 153 Tarzana, Calif. 91356

CONTECH

CIRCLE 506 ON READER SERVICE CARD

9-TRACK TAPE SYSTEMS!



OVERLAND DATA IS THE EXPERT when it comes to connecting your PC to the mainframe and mini computer world.

- PC/XT/AT/386/PS2/compatibles
- 800, 1600, 3200, 6250 BPI
- Free tutorial on tape systems
- EBCDIC/ASCII conversion
- IBM & ANSI labeled tapes
- DOS, XENIX, UNIX, PICK
- Highest quality customer service
- Stock full range of tape drives
- Network backup and More!

Overland Data Inc.

5620 Kearny Mesa Rd. • San Diego, CA 92111
Tel: (619) 571-5555 • FAX: (619) 571-0982

CIRCLE 554 ON READER SERVICE CARD

KODAK DATASHOW from \$599

- Project Your PC Screen To Large Screen
- Solution for EGA, CGA, MAC, DEC and More
- Sales and Rentals

BOXLIGHT CORPORATION
(415) 892-4744

Computer Based Presentation Systems Since 1984

CIRCLE 596 ON READER SERVICE CARD



CONNECT!

9-TRACK TAPE

- Complete system manufacturer
- Support PC/XT/AT/PS2 & Mac
- Read & write 800/1600/6250
- Use with IBM, DEC, HP tapes
- Links to FORTRAN, C, COBOL
- Networking capability
- Customized software available
- Powerful data extraction
- Large inventory of Anritsu, Clpher, Kennedy, Qualstar
- Fast technical support
- System prices from \$2995

Avoid the middleman—Go direct!

FLAGSTAFF ENGINEERING 602-779-3341 FAX 779-5998

CIRCLE 582 ON READER SERVICE CARD

9-Track Tape Subsystem



MINISTREAMER™

Now you can exchange data files between your IBM PC/XT/AT and any mainframe or mini-computer using IBM compatible 1600 or 6250 BPI 9-Track tape. Unit can also be used for disk backup. Transfer rate is up to 4 megabytes per minute on PCs and compatibles. Subsystems include 7" or 10½" streaming tape drive, tape coupler card, cables and software.

QUALSTAR

9621 Irondale Avenue
Chatsworth, CA 91311
Telephone: (818) 882-5822

CIRCLE 527 ON READER SERVICE CARD

Never pay for another ribbon!



MacInker™, the automatic ribbon re-inker re-inks any fabric ribbon at 5 cents/re-inking in black or any color. Lubricating ink cools ribbon, extends printhead life. Avg. re-inkings per cartridge, 60-100. **Universal MacInker** (cartridge or spool) \$68.50. **Epson or Imagewr.** \$42.00. **Multicolor adaptors** available for 4-color cartridges. Over 100,000 sold, over 20,000 printers supported. Satisfaction or 30 day refund. Free keybeeper-flashlight for orders >100\$. **Order toll free** or call for free catalog.

(800) 547-3303 **Computer Friends**
14250 Science Pk. Dr.
Portland OR 97229
tel. (503) 626-2291
fax (503) 643-5379

Major credit cards, cod, POs from national accounts accepted

CIRCLE 483 ON READER SERVICE CARD

PLUG A CASH DRAWER INTO YOUR COMPUTER

Turn your Computer into a powerful Point of Sale System!

Colors, Sizes, and Models for All Applications

Interface Options

- RS-232 serial (3 types)
- Centronics parallel
- Receipt printer interfaces
- Others (TTL, Signal pulse, non-connected, multiple drawer)

For catalog & details:

APG

1601 - 67th Ave. North
Minneapolis, MN 55430 • (612) 560-1440
A Division of Upper Midwest Industries, Inc.

CIRCLE 512 ON READER SERVICE CARD

CATALOG

PC WORLD

Shop The PC World Catalog for fast solutions to your PC needs.

Plotters

Affordable Large Format Plotting



C-D
\$1695
(Sugg. ret. \$2295)

A-D
\$2295
(Sugg. ret. \$2695)

A-E
\$2695
(Sugg. ret. \$2995)

Made in USA

Features that say value ...

Economical: \$1,000 less than other large format plotters.

Compatible: Operates with all popular CAD software supporting DM/PL.™

Multiple Media Sizes as small as 8½" x 11" or as large as 36" x 48" eliminates the need for a second plotter.

Practical speed you can really use: 10" per second assures good drawing throughput while optimizing the speed at which most plotter pens can draw without skipping.

Repeatability and Resolution: .004 assures quality suitable for the most demanding applications including PCB artwork.

Vacuum Paper Hold Down guarantees perfect registration.

CALL NOW AND WE'LL SEND YOU A FREE SAMPLE PLOT.

(415) 490-8380

Dealer inquiries invited.

ZERICON

40491 Encyclopedia Circle, Fremont, Ca 94538

DM/PL is a trademark of Houston Instrument

CIRCLE 532 ON READER SERVICE CARD

Security

DataLock™ Security Card

Prevents Unauthorized Access to your PC

- Password protected system boot
- Activated automatically at power up
- Controls access to all hard/floppy drives, printers, serial network & modem
- Administer passwords and device access rights to as many as 20 users
- Completely menu driven
- Screen-saver
- Floppy disk utilities included
- Easy installation in any available full or half slot
- Secures all PC/XT/AT and 100% compatible PCs, DOS or XENIX

Don't be taken by software-only security that leaves your system bootable by floppy!

PC Cabinet Lock included with every order

\$145 + 5 S/H (first three)

CHK/MO/COD/VISA/MC

NY residents add 7 1/2% tax

1 Year Warranty

Call for our free Demo Disk!



MicroDevelopment Corp.

8 Milford Lane

Melville, NY 11747

(516) 673-9257

DataLock is a trademark of MicroDevelopment Corp. PC, XT & AT are trademarks of IBM Corp. XENIX is a trademark of Microsoft Corp.

CIRCLE 547 ON READER SERVICE CARD

Security Kits•Cust Cables
PC Lock secures PC, XT, PS2, & clones, including base, monitor, keyboard, & most peripherals & boards. Attractive 8' steel cable. Lock incl. No tools req. \$back guarantee. \$50 + \$4s/h. Special kits also avail. for Mac & many others. Custom PC Cables, any length, connect any devices. Std. 8' \$29.95.

Mac Products

20231 San Gabriel Valley Dr.

Walnut, CA 91789

714/595-4838

MISCELLANEOUS/Accessories

Mouse Pads

Co. Logo Specialist.

Grey, Green & Red Pads.

Size: 9¼" x 8" x ⅜"

• 12 pads w/logo \$9.50

• 72 pads w/logo \$6.90

• 144 pads w/logo \$4.70

• 500 pads w/logo \$4.14

• 1000 pads w/logo \$4.02

ENTIRE pad imprintable.

GUARANTEED to last.

MULTI-COLOR jobs OK.

SAMPLES w/logo \$12.50.

Computer Expressions

3833 Chestnut St.

Philadelphia, PA 19104

800/443-8278

ComputerWear

100% COTTON CANVAS DUST COVERS

100% Cotton Canvas - Beige, Grey Trim
Breathable! Static Free!

For: IBM, Compaq, Leading Edge, AT&T
Clones, Compatibles and Printers:
All Epson, Okidata, IBM, HP, Apple, NEC
Free Catalog. Dealers Welcome!

OrderToll-Free

1-(800)826-5761

Contemporary ComputerWear
1320-36th Ave. San Francisco 94122

CIRCLE 543 ON READER SERVICE CARD

SnapOn KeyCaps

For IBM PS/2 Keyboards
Supporting: WordPerfect 5.0

& IBM 5251 Emulation or
Custom Imprinted!

- Relegendable Keys •
- Custom Key Imprinting •
- Keyboard Protectors & More! •

FREE CATALOG!

Phone: 602-634-7515

Fax: 602-634-4620

Hooleon CORPORATION P.O.B. 201, Dept. PCWD
Cornville, AZ 86325

CIRCLE 518 ON READER SERVICE CARD

SECURITY

PADOLOCK™ physically secures your computer from theft without cables or bolts. Two interlocking steel pads use high-bond acrylic adhesive technology to protect your equipment with 10,000 lbs. of strength. Easy to install. Order keyed different or alike. \$79.95 + \$5.00 shipping

CONTROL POWER™ gives you control over the use of your computer with a key. No unauthorized access. Control Power attaches to any electronic device with a removable, 3 prong power cord. Order keyed different or alike. \$69.95+\$3.00 s/h

(415) 861-2223

DOSS INDUSTRIES

1224 Mariposa St. S.E. CA 94107

CIRCLE 550 ON READER SERVICE CARD

PC-DocuRef™ SOFTWARE QUICK REFERENCE

ONLY \$19.95

- Slash PC training time/cost, boost productivity
- Multi-page, color-coded guide, fits any keyboard
- Makes software simpler, easier to use
- Concise summary with examples, tips, warnings
- Available for these programs:

**WordPerfect -Lotus 123 -Microsoft WORD
DOS/Basic -dBASE III+ -MultiMate Adv. II**

To order call:

1-800-762-7874

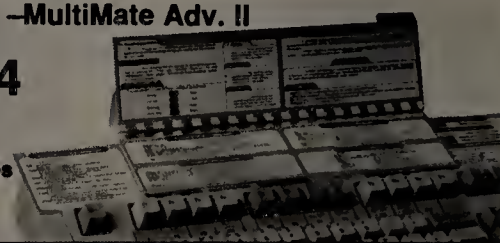
(In NC call 919-878-3600)

60-Day Guarantee

Systems Management Associates

3325 Executive Drive Dept. PW-1

Raleigh, NC 27609



CIRCLE 575 ON READER SERVICE CARD

CATALOG

PC WORLD

Shop The PC World Catalog for fast solutions to your PC needs.



CompuTogs Dust Covers

The ultimate in dust protection. Available in natural canvas/brown trim or new designer gray/black trim (add \$2/cover). Our covers are far superior to vinyl. TYPICAL PRICES:

COMPARE OUR PRICES! MONITOR 15.95 PRINTER (specify) 15.95
KEYBOARD 13.95 MON/CPU 24.95

CompuTogs. P.O. Box 19728, Greensboro, NC 27419 • (919) 292-9060
VISA/MC Accepted. Include \$2.50 Shipping
CUSTOM EMBROIDERY SHOWN AVAILABLE

1-800-227-TOGS

CIRCLE 559 ON READER SERVICE CARD

FREE GLOBAL CATALOG

148 page guide to computer furniture, supplies and accessories

Dial Toll-Free 1-800-8-GLOBAL

GLOBAL
COMPUTER SUPPLIES
45 S. Service Rd., Dept. CL
Plainview, NY 11803

CIRCLE 508 ON READER SERVICE CARD

Bar Coding

VARIANT MICROSYSTEMS BAR CODE READERS DELIVER

WAND/ LASER/ MAGNETIC
CARD CONNECTIVITY

- Keyboard wedges (Internal/External) for IBM PC/XT/AT, PS/2 and portables
- RS232C wedges for WYSE, Link, Kimtron terminals
- Autodiscriminate between codes 3 of 9, UPC, EAN, 12 of 5, Codebar, Code 128
- Interface with wands, Symbol Technologies' LS 7000/8000 and Photographic Sciences lasers
- Bar code and label printing software
- Full two year warranty
- 30 Day Money Back Guarantee
- Extensive VAR/Dealer Discounts



VARIANT MICROSYSTEMS
3140 De La Cruz Blvd.
Suite 200
Santa Clara, CA 95054
(408) 980-1880



CIRCLE 468 ON READER SERVICE CARD

BAR CODE & MAGNETIC STRIPE READERS for the IBM PC & PS/2

Simple & quick installation
No additional software or port
Metal wand & case

Also available:

Bar code printing software
Magnetic stripe encoders
Units for other computers & terminals

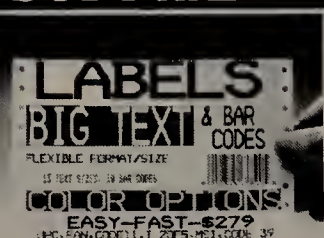
GSA pricing available

TPS ELECTRONICS
4047 Transport Street
Palo Alto, CA 94303

Telephone: 415-856-6833
Telex: (Graphnet) 371-9097 TPS PLA
FAX: 415-856-3843

CIRCLE 522 ON READER SERVICE CARD

LABELING SOFTWARE



for DOT MATRIX and Laser Printers (Epson/IBM/Okidata/LaserJet)

- Design Label on one Screen
- Any format, any size
- Text readable from 50 ft.
- 13 Text Sizes, 12 Bar Codes
- UPC/EAN, 128, Codabar, MSI, Code 39, MIL-STD, AIAG
- Logos, Color, Reverses, Lines
- Laser Soft Fonts (8 ppm)
- Fast • Easy • File Input
- Label above by \$279 program
- Other DOS programs from \$49
- Menu-driven XENIX-\$199
- DOS callable routines from \$159

Bar Code Readers PC/XT/AT and PS/2

Plus all compatibles and Kimtron, WYSE-60, Link, & RS-232

- Attaches as 2nd Keyboard
- No software changes
- Rugged metal pen and holder
- Reads 12 of 5, UPC/EAN, Codabar, Code 39, etc.

All models complete... \$399

ALSO: Portables, Lasers, Mag-Stripe. Direct from Manufacturer



WORTHINGTON DATA SOLUTIONS

417-A Ingalls Street,
Santa Cruz, California 95060

800 345-4220

CA 408/458-9938

30 Day \$ Back Guarantee



Bar Code Solutions ON-LINE BAR CODE READER NETWORK

NEW PC-WAND 300 - up to 128 reader data collection system • Auto-discriminates • Collects, formats and transmits to PC or host.

PC-WAND 800 WanderWand - programmable portable bar code readers.

PC-WAND 200 - terminal wedge on a serial "party line" for mini's.

PC-WAND 100 - emulates 2nd keyboard.

NEW - bar code printing software packages for your printer.

DEALER INQUIRIES INVITED
INTERNATIONAL TECHNOLOGIES
& SYSTEMS CORP.

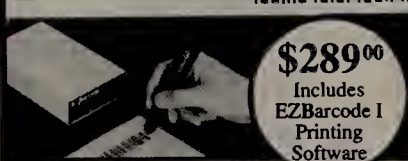
635 North Berry Street, Suite C,
Brea, CA 92621

PHONE: 714 990-1880

FAX 714 990-2503

CIRCLE 501 ON READER SERVICE CARD

EZBarcode™



\$289.00

Includes
EZBarcode I
Printing
Software

Bar Code Reader

Model PC-WEDGE Reader \$289.00

- No software changes necessary
- For PC/XT/AT or compatible
- Reads Code 39, 2 of 5, UPC, Codabar
- EZBarcode I printing software included

EZBarcode I Printing Program
(ordered separately) \$49.00

- Enter and print Code 39 and UPC-A
- For dot matrix and LaserJet printers
- Vary bar code height, spacing, etc.

EZBarcode II Printing Program ... \$99.00

- Keyboard or text file data input
- Prints Code 39, Interleaved 2 of 5, UPC-A
- Automatic incrementing, multiple columns

dBARCODE™ Program prints bar codes from within dBASE III Plus \$99.00

TimeKeeping Systems, Inc.

12434 B Cedar Road • Cleveland, OH 44106

(216) 229-2579 • Fax: (216) 229-2573



PrintBar II

BAR CODE PRINTING SOFTWARE

Print Code 39, 2 of 5, UPC, and EAN bar codes directly from your own programs in dBASE, Lotus, WordStar, C, BASIC, without copying data to special print files. IBM PC/XT/AT and compatibles. Easy set-up. \$295.00

CodeScan 2000 \$495.00

Bar Code Reader

FREE Brochure (916) 622-4640

Bear Rock
SOFTWARE COMPANY, Inc.

6069 Enterprise, Placerville, CA 95667

CIRCLE 557 ON READER SERVICE CARD

Business Opportunities

Software Dealers Wanted

Perfect Care program needs dealers. We teach how to sell, install & support our medical billing sys. to MDs... a profitable high growth service industry. We offer • Training & continuous support • 7 yrs of medical computer exp. • Protected territories nationwide.

Ted Itzkowitz

STI Computer Services, Inc.

251 W. DeKalb Pike-Concord 107

King of Prussia, PA 19406

215/768-9030



Distributors

Wanted!

(214) 750-9889

N.D.R.C.

Dallas Texas

CIRCLE 464 ON READER SERVICE CARD

Catalogs

Largest Software Library

World's largest software library. Thousands of powerful programs for IBM/PC, XT, AT (3.5 format available) & Apple IIe, GS. Items including business, CAD, education, games & religion. Free catalog sent to you by Airmail, specify your computer type, write:

Reliant, Dept-pc

PO Box 33610

Sheungwan, Hong Kong

CATALOG G

Shop The PC World Catalog for fast solutions to your PC needs.

IBM PCjr Specials

Full line of IBM PCjr hardware accessories including: Memory expansions, Second floppy drive, Hard drives, Cables, Larger keyboards, Modems, Printer expansions, Manuals, & software. Many more items are available. Send today for the complete catalog.

Computer Reset

Dept. PW, Box 461782
Garland, TX 75046-1782
214/276-8072

PCjr

Expansion Products

Possibly the largest selection of PCjr products in the country. We don't just sell PCjr products, we design them.

- Speed Up Products
- Pseudo DMA Cartridges
- Second Floppy Disk Drives
- 3 1/2" Disk Drives
- PCjr Optical Mice
- Monitor Adapters for PC's
- Parallel Printer Ports
- Full Size Keyboards
- Speech Attachments
- Joysticks, Cables, & Adaptors

Call or write to receive our free 32-page catalog of PCjr Add-On products. For even faster results, circle our reader service number.

PC Enterprises

"The jrProducts Group"

Box 292, Belmar, NJ 07719
(201) 280-0025 (800) 923-PCJR

CIRCLE 516 ON READER SERVICE CARD

Computer Insurance

SAFWARE

Insure your computer. Safeware provides full replacement of hardware, media, & purchased software. As little as \$39 a year provides comprehensive coverage. With our blanket coverage, no lists of equipment are needed. One phone call does it all! Call 8am to 10pm EST (Sat 9 to 5) Safeware, The Insurance Agency 2929 N. High St., PO Box 02211 Columbus, OH 43202 800/848-3469, 614/262-0559

Data/Disk Conversion

Data/WP Conversions

MAGNETIC TAPE TO DISK
DISK TO MAGNETIC TAPE
(800/1600 BPI)
DISK TO DISK
SPECIAL APPLICATIONS
Over 2000 Conversions Available.
\$35 per disk. Quantity discount available.

Magnetic Data Conversions Inc.
180 N. Michigan Ave. #1040
Chicago, IL 60601
800/621-9155, 312/726-6455

SOFTWARE DUPLICATION

- One Stop Shopping
- Custom Packaging
- Copy Protection
- Technical Support
- Drop Shipping
- Fast Turn-Around
- Competitive Pricing

SATISFACTION GUARANTEED

800-222-0490
In NJ 201-462-7628

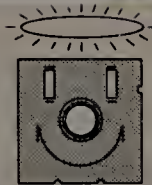
MEGAsoft

P.O. Box 710, Freehold, NJ 07728
"We are the Industry Leaders"

SCANNING any font or typestyle disk or tape **CONVERSION** **DUPLICATION** any size, any quantity

- Data Entry
- Custom Programming
- Data Management
- Bar Code Conversion

(312) 858-4566



We perform miracles!

MEDIA CONVERSION CORP.

Free Tests and Quotations—24 Hour Turn-Time



CIRCLE 462 ON READER SERVICE CARD

TAPE/DISK CONVERSIONS



Conversion services to or from over 1250 computer systems:

- Magtapes • Mini Computers
- Micro Computers • Typesetters
- Word Processors

CALL THE INDUSTRY LEADERS

PIVAR
COMPUTER SERVICES, inc.

(312) 459-6010

165 Arlington Heights Rd #W
Buffalo Grove, IL 60089

CIRCLE 597 ON READER SERVICE CARD

Disk Copy Service

SOFTWARE PRODUCTION

- ★ Disk duplication
- ★ All formats
- ★ EVERLOCK copy protection
- ★ Label/sleeve printing
- ★ Full packaging services
- ★ Warehousing
- ★ Drop shipping
- ★ Fulfillment
- ★ 48-hour delivery
- ★ Consultation & guidance

Star-Byte, Inc.

2880 Bergey Rd., Hatfield, PA 19440
800-243-1515 215-997-2470

CIRCLE 519 ON READER SERVICE CARD

Duplication from 59¢

Affordable rates only 59¢ for 5.25" & \$1.59 for 3.50" MS/DOS Disk Duplication. Cumulative Purchase Plan rates go even lower as you continue to order! Price Includes:

- Quality Brown Disc Media
- Duplication + 100% Verify
- Label Application
- Quick Turn Around
- Guaranteed Products

Diversified Systems Group, Inc.
PO Box 1114
Issaquah, WA 98027
800/255-3142, 206/392-0900

Disks

BUY QUALITY FOR LESS! DYSAN

5 1/4" DS/DD **39¢**

100% CERTIFIED LIFETIME WARRANTY
Price based on quantity of 250 in bulk includes Tyvek sleeves and label kits.

800-222-0490

In NJ 201-462-7628
FAX 201-462-5658

• 24 HOUR SHIPMENT •
MEGAsoft
P.O. Box 710, Freehold, NJ 07728
Full service duplication facility

BUY QUALITY FOR LESS! MAXELL

5 1/4" DS/DD **59¢**

3 1/2" DS/DD **1.15**

LIFETIME WARRANTY

Price based on quantity of 300 in bulk includes Tyvek sleeves and label kits.

800-222-0490

In NJ 201-462-7628
FAX 201-462-5658

• 24 Hour Shipment •
MEGAsoft
P.O. Box 710, Freehold, NJ 07728

CONNECT!

YOUR OWN DESKTOP CONVERSION SYSTEM

- Complete system manufacturer
- Support PC/XT/AT/PS2 & Mac
- Read & write most 8" 5 1/4" 3 1/2" diskettes from IBM systems and word processors
- Read & write 1/2" 9-Track tapes from most computers
- Read text from documents, forms, books and magazines using "SPOT" OCR program
- Customized software available
- Fast technical support

Avoid the middleman—Go direct!

FLAGSTAFF ENGINEERING 602-779-3341 FAX 779-5998

CIRCLE 581 ON READER SERVICE CARD

CATALOG

Shop *The PC World Catalog* for fast solutions to your PC needs.

Why waste your time formatting disks?

Preformatted disks save you time and money!

Memorex • Nashua • 3M

5 1/4" (from 48¢) • 5 1/4" HD • 3 1/2" • 3 1/2" HC

Call toll-free TODAY!

1-800-321-4668

In Colorado (303) 423-0371. Open 8:00 to 5:30 Mountain Time, Monday - Friday.

ALF

ALF Products, 3940 Youngfield St., Wheat Ridge, CO 80033

CIRCLE 502 ON READER SERVICE CARD

Supplies

High/Res. Paper/Film

Get high resolution from plain paper laser printers, and color plotters. LASEREDGE™ high resolution Papers/Films are waxable for paste-up. The bright white background, denser image, and finer edge of line will allow enhanced capability for 300 dpi to reproduce on camera. Call or write for samples today. Visa/MC. CG Graphic Arts Supply, Inc. 481 Washington St. New York, NY 10013 800/342-5858

P.C. Copier & Laser Printer Owners



TONER Service Company

UPS to:
2128 Dolman
St. Louis, MO
63104

We buy empties - \$10.00

314-776-1155

800-88-TONER

CIRCLE 545 ON READER SERVICE CARD

GENUINE HEWLETT PACKARD TONERS \$79.50

Huge Inventory In Stock
For Same Day Shipment Call

• 1-800-22-TONER
• 1-800-228-6637

Plotter Supplies At Similar Savings

TONERS PLUS...

CIRCLE 600 ON READER SERVICE CARD

National Laser Recharge

Save your money! Let us recharge your toner cartridges for HP Series I & II, Apple, Canon, QMS & others. All Canon, PC models 100% Guaranteed Factory-Like recharge method. No drill & fill! **Long Life method for only \$49** incl. s/h. Up to 7 charges per cartridge Color avail. We buy empties -\$10. Send cartridge w/check or Money Order To:

National Laser Recharge
1413 W. Loop 281, Ste. 101
Longview, TX 75604
214/297-0200

CIRCLE 472 ON READER SERVICE CARD

AMERICAL GROUP

5 1/4" DS DD 29¢ ea.
INCLUDES SLEEVES & LABELS MIN. QNTY. 200

100% LIFETIME WARRANTY

3 1/2" DS DD (min 25)	1.10 ea.
5 1/4" DS HD (min 30)	.69 ea.
5 1/4" DS HD (Color)	.90 ea.
5 1/4" DS DD (Color, min 100)	.45 ea.

Visa/MC accepted
12132 Sherman Way
N. Hollywood, CA 91605

Shipping \$4.00 per min order/\$2.00 each additional lot

(818) 765-3040

CIRCLE 541 ON READER SERVICE CARD

Networking

FREE

LOCAL AREA NETWORK
information and literature.

WARNING: Don't buy Novell or other network until u call 3-minute recording that explains options and how to save literally thousands of dollars. At end of tape, leave address on machine and receive a comprehensive literature package with our recommendations and advice about installing networks.

(415) 837-2385

CIRCLE 491 ON READER SERVICE CARD

Toner Cartridge Recharging Specialist



WE TAKE PRIDE IN OUR CARTRIDGES!
100% UNCONDITIONAL GUARANTEE

• No Holes Cut • 20% More Toner
• Darker Print • 24 Hr. Turnaround
LASER PRINTERS - PC COPIERS \$36.95

Call For Brochure

JT TECHNOLOGY

40 Old Hickory Cove
Jackson, TN 38305
901-664-5011

CIRCLE 542 ON READER SERVICE CARD

Typesetting

High-Tech Typesetting

Transmit your text toll-free, error-free via modem to our fully automated typesetting system. \$2 per thousand characters, \$5 minimum. Same-day service. 200-typefaces, sizes up to 72 point. Send \$20 ppd. for our 200 page guidebook, or call toll-free & use your MC/Visa/AmEx.

Intergraphics
106A South Columbus St.
Alexandria, VA 22314
800/368-3342 or 703/683-9414 in DC

reconditioned TONER cartridges!

for laser printers & Canon PC Copiers

From **\$44.95**

BETTER THAN NEW!

- 20% MORE TONER
- DARKER PRINT
- 100% GUARANTEED

Willow Products Corp.
3857 Willow Ave, Pgh, PA 15234

We buy empties
call for brochure
800-426-8196



CIRCLE 535 ON READER SERVICE CARD

CATALOG

PC WORLD

Shop The PC World Catalog for fast solutions to your PC needs.

SOFTWARE Accounting

PC-FUND®

The leading fund accounting system for local governments and non-profit organizations. Modules include General Ledger, Payables, Encumbrances, Obligation Tracking, Receivables, Payroll, Budgeting, Fixed Assets and Donor Receipts. PC-FUND runs on the IBM-PC and compatibles under MS-DOS, XENIX, AND most LANs.

American Fundware, Inc.
Box 3028

Steamboat Springs, CO 80477
303/879-5770, 800/551-4458

MIP Fund Accounting

The MIP Fund Accounting System meets the financial & managerial reporting requirements of not-for-profit & governmental organizations. Modules offered: G/L, A/P, A/R, Payroll, Encumbrance, Expenditure Budget, Revenue Budget & Lotus/dBASE Interface. MIP FAS is available for IBM XT/AT. Also, Network available. Micro Information Products
505 East Huntland Dr. #340
Austin, TX 78752
800/647-3863, 512/454-5004

dBASE Business Tools

- GENERAL LEDGER
- ORDER ENTRY
- dINVOICER & A/R
- SALES ANALYSIS
- SERVICE BILLING
- ACCOUNTS PAYABLE
- PURCHASING/INVEN.
- JOB COSTING
- JOB ESTIMATING
- PAYROLL

\$99 ea + s/h includes dBASE 2, 3 or 3+ Source Code. MC/AmEx/Visa/chk/COD.
Datamar Systems
4376-W Santa Monica Ave.
San Diego, CA 92107
619/223-3344

Accounting Conversions

Converting to Solomon III® from another PC system? We are a service bureau specializing in automatic transformations from other mainstream packages with analysis by a highly experienced Solomon consultant. Other custom conversions available. Fast turnaround. Prices from \$895; call for quote.
DataTrade, Inc.
P.O. Box 5297
Willowick, OH 44094
216/944-9420

ACT 1

SERIES
\$179⁵⁰

+11 50 Shipping & Handling, U.S.

Includes:

General Ledger
Accounts Receivable
Inventory
Sales Invoicing
Accounts Payable
Payroll

1-800-344-2540

COUGAR MOUNTAIN

S.O.F.T.W.A.R.E.

2609 Kootenai • Boise, Idaho 83707

Accounting At Its Best

OTHER PROGRAMS AVAILABLE

ACT-2 multi-user or network ready accounting.
ACT-4 multi-user for XENIX System V Fund Accounting, single and multi-user for non-profit organizations.
Bill of Materials for manufacturing inventory.
Point of Sale with bar code and cash drawer interface.
Training Seminars and Toll-Free Hotline Support Available.
Hardware Requirements: IBM PC* or compatible. Hard disk required.

ACT 1
BEST BUY
3 Consecutive Years



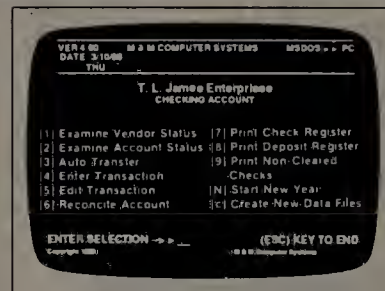
Trademark: IBM-
International Business
Machines. XENIX.
Micro Soft.

CIRCLE 553 ON READER SERVICE CARD

FOR PEACHTREE ACCOUNTING USERS!

QuickCheck™ Checking Account Management System:

- Reads In All Checks from Accounts Payable and Payroll
 - Yearly History File
 - Easy Check Book Reconciliation
 - New Sales/Commission Program Available!
 - ONLY \$99.00
- 805/934-2180



1386 Solomon Rd., Santa Maria, CA 94555

CIRCLE 579 ON READER SERVICE CARD

Business Bookkeeping

Ingenious no-accounting way to keep accurate books! Print checks, schedule payments, predict cashflow, reconcile statements in a flash. Save accounting fees; send transactions to your accountant electronically. Worth every penny (\$395) or money back. Explore in detail & print sample reports with \$5 demo.

Microcomputer Specialists, Inc.
PO Box 795
Woodstock, VT 05091
800/833-1500, 802/457-4600

FUND Accounting

Automatically reports your most pressing info needs: Mgt. reports, financial stmts., budget comparisons, project expenses. FREE spreadsheet interface. Integrates with AR, AP, Payroll. PC-Network compatible. Demo, pre-sale set up, post-sale training/installation available. 30-days FREE phone support.

Executive Data Systems, Inc.
1845 The Exchange #140
Atlanta, GA 30339
800/272-3374, 404/955-3374

Nonprofit Software!

ECHO software has been meeting the needs of hundreds of organizations like yours since 1980. We offer complete Accounting, Fund Raising Management, Human Service Client Information & Third-Party Billing Systems. All provide clear, tight audit trails, flexible reporting & easy operation. Single user & network versions available.

For information:
Echo Consulting Services, Inc.
PO Box 540
Center Conway, NH 03813
800/635-8209, 603/477-5453

LedgerMax II

"I learned LedgerMax in about two hours, without looking at the book. It was so easy!" Ann Beneza
The complete, integrated system for small business. Includes checkwriter GL, AR/AP, Reports, Payroll & More. Try before you buy with our free evaluation disk. Call or write now:

Small Byte Systems, Inc.
954 Pearl Street
Boulder, CO 80302
800/728-3537

FORTUNA Accounting

Manual published (ISBN 962-7325-01-5). Proven in med/large companies. Double posting to G/L, A/R or A/P. Simple to use-design identical to manual system based on books & pen. Example data files included. All DB 3+ source programs included. \$30 (manual, 5*360K disks, s/h). Support thru Fax: 852/3-785-4137.

Fortuna Automation & Machinery Co.
Block B, 6/F, Ka Ming Court
688 Castle Peak Road
Kowloon, Hong Kong

Business Applications

Do-It-Yourself Business Plan

Type your data into our spreadsheet models for cash flow, ratios, graphs, complete financials. Looseleaf manual walks you through the steps to create a complete business plan. Includes all you need, even sample texts on disk.

Business Plan Toolkit \$99.95

Use with Lotus 123 on a PC, or Excel on a Mac. (\$5.00 shipping, 7% tax in CA)

Palo Alto Software

260 Sheridan Av #219 Palo Alto, CA 94306
(800) 336-5544, CA (415) 325-3190

CIRCLE 487 ON READER SERVICE CARD

CATALOG

PC WORLD

Shop The PC World Catalog for fast solutions to your PC needs.

Do You Ship by UPS®?

If you do, the Aristo Parcel Shipping System (APSS™) is for you! Meets all UPS requirements. Prints COD & regular labels, Pickup Manifest, etc. Saves customer list. Calculates zones & charges. Flexible setup menu to suit your needs. On-line help. Optional scale interface & other carriers. \$395; 60 Day \$ back gtd. UPS approval gtd. Full featured demo disk: \$4 s/h.

Aristo Computers, Inc.
6700 SW 105th Ave. #307-J
Beaverton, OR 97005
800/3ARISTO, 503/626-6333

Linear Programming

MINI-MAX (\$395) is saving a copier refiner \$10,000 a month. "It's extremely easy to use," says an investment counselor in Oakland, CA. See how linear programming can boost your profits. The demo disk (\$35) includes a Beginner's Guide and 70-page manual with 7 examples from business & industry.

ASC, Inc.
PO Box 32, Dept. P
Kingsville, TX 78363
512/595-1937 Telex 6713995

Personnel Supervisor

Human resource management for up to 99 employees. Review alerts, attendance control, salary & rating history, empl. emerg. info., birthday lists, 1-9 tracking, salary budgeting—over 20 reports. User definable codes. Indexed manual with worksheets. \$149. Demo \$20, creditable to purchase. 6 mo. FREE updates. MST Software
#1 Tierra Vista
Laguna Hills, CA 92653
714/837-3664

The Retailer System

POS - This is software that will turn your computer into more than a cash register. Features sales register with totals & change, reports reorder points, cost of goods sold, industry, total sales & tax. IBM or 100% compatible. Dealers welcome. Full function demo \$50. Software with cast drawer \$850.

Just-In Software Corp.
96 Lucille Ave.
Staten Island, NY 10309
718/948-4224

Personnel System 2.0

for your firm &/or dept's records, attendance, vacations, etc. Print Vac./\$ overview, Org. chart & more. Very user friendly \$199. APPOINTMENT-NA PHONE BOOK Multi-Schedules, year shown, then pick & plan \$29. NA book w/dial \$19. PC SQUARED (Call 24 hrs)
PO Box 1508
Lindenhurst, NY 11757
516/957-2573, 800/356-5179

Business Plans

BizPlanBuilder™ Quickly & easily complete an effective business / marketing plan for presentation to investors, Sr. management or clients. A comprehensive and proven framework—Over 85 pages of outlines, headlines, structured sentences & paragraphs, lists, financials, suggestions... already typed into 29 ASCII text files & Lotus®. Follow tutorials & edit into a finished plan. Includes manual. Preferred by investment capital experts, corp. mgrs & experienced consultants. \$99⁰⁰+\$3 UPS

Tools For Sales™ 30-day accept / return
13335 Wildcrest Drive Site license avail.
Los Altos Hills, CA 94022 Visa•MC•Amex
800/ 442-7373 • 415/ 941-9191 Call today.

CIRCLE 555 ON READER SERVICE CARD

THE GENERAL STORE RETAIL OPERATIONS SYSTEM

The complete software system for RETAIL. Multiuser/Network ready. Cash Drawer. Bar Code and online credit card auth.



Accounts Receivable
Inventory Control
Point of Sale
Accounts Payable
General Ledger
Mailing List
• Hardgoods
• Apparel

\$995

Dealers welcomed.

Crichlow Data Sciences, Inc.
(804) 428-0005
P.O. Box 6420 - Virginia Beach, VA 23456

CIRCLE 470 ON READER SERVICE CARD

Before EZ-FORMS

After EZ-FORMS

EZ-FORMS: Industry Standard!
Create, Fill-Out (including pre-printed), File, Revise any form. 90+ included! More available.
• Lite—\$49 • Executive—\$99
V/MC/AX/Dis/OK Ref. W49G
Orders Only: 1-800-873-2799
INFO: 1-713-280-9900

CIRCLE 589 ON READER SERVICE CARD

TISAR-PC

(Pronounced TY-ZAR)

INVOICING

FULLY INTEGRATED
Remarkable Turn-Key System

- Data-base
- Invoicing
- Inventory control
- 3,000 records per file
- 12,000 invoices per file
- Accounts received
- Accounts receivable
- Customer statements
- Mailing labels

Keep records the way big business does...
(Hard drive required)

IDEAL for service or sales/mktg businesses. Easy, menu-driven, user friendly, fully tested. Up and running in under 3 minutes. Free customer support.

Call orders 1-800-537-LABS or ask your dealer.

LIMITED OFFER
\$79.00

Now with point of entry pricing and user definable fields.

Search, cross-search, fast sorts, reports and much more.

COD gladly accepted

10610 Evans Street
Philadelphia, PA 19116

Dealer inquiries invited

Save Legal Fees By Using LegalEase™

LegalEase™ is a simple, ready-to-use business and legal forms system for IBM® PC's with over 150 time-tested models for contracts, agreements, leases, notices and binding business forms. Edit with PC Write™ WordStar® MultiMate™ or any other standard word processing software. LegalEase™ is menu driven and was written for non-lawyers by a respected Boston attorney, Richard H. Gens.

Now! The Real Estate and Corporate Modules of LegalEase™ The Real Estate Module comes complete with a wide range of Real Estate forms. The Corporate Module contains all the basic legal forms for corporate meetings.

Now available! The High Tech Module of LegalEase™
LegalEase: \$129.95 (add \$7.50 p&h). Both the Real Estate Module and the Corporate Module: \$99.95 ea (add \$7.50 p&h). Any combination of packages: take \$10.00 off each package (add \$10.00 p&h).

1-800-628-2828 Ext. 706

LegalEase™

HDG Software, Inc.

381 Old Jail Lane, Barnstable, MA 02630

For faster service, (617) 362-8109

CIRCLE 510 ON READER SERVICE CARD

CASHTRAX®

THE Point Of Sale SOFTWARE PACKAGE

- Full Invoicing
- Inventory Control
- Bar Code Compatible
- Purchase Order Summaries
- Redirect Data Files

- Cash Drawer
- Profit Reports
- Backorder & Sales
- 40/80 Col. Serial Printer
- Change the Passwords

Hardware Also Available **(800) 448-0088**

CIRCLE 474 ON READER SERVICE CARD

CATALOG

Shop *The PC World Catalog* for fast solutions to your PC needs.

THROW AWAY YOUR COMPUTER MANUALS!

Learn popular software programs with:

VIDEO INSTRUCTION TOOLS

Lotus 1-2-3 (4 hrs.)	\$ 99.95	PageMaker 3.0 (3 hrs.)	199.95
WordPerfect 5.0 (5 hrs.)	129.95	Ventura Publisher (2 hrs.)	179.95
WordPerfect 4.2 (3-1/2 hrs.) . .	99.95	Advanced Ventura (2 hrs.)	179.95
DOS 3.3 (4 hrs.)	129.95	Dbase III+ (4 hrs.)	179.95

New for '89 — Available Today! (\$199.95 ea.)

- Introduction to IBM PS/2
- DisplayWrite IV
- Symphony
- Enable

For Beginners! (90 minutes each)

Intro to Spreadsheets . . . 59.95	Intro to IBM-PC 79.95
Q & A 79.95	Microsoft Works 79.95

For the Macintosh

Hypercard 79.95	PageMaker 3.0 199.00
Microsoft Word 4.0 . . . 129.95	

Ask about our unlimited 60-day phone support program.

For Product Info and Complete Brochure:
1-800-537-1641

Michael Halverson & Associates
1313 Newburgh Road
Westland, Michigan 48185
(313) 729-0325 • FAX (313) 729-0238

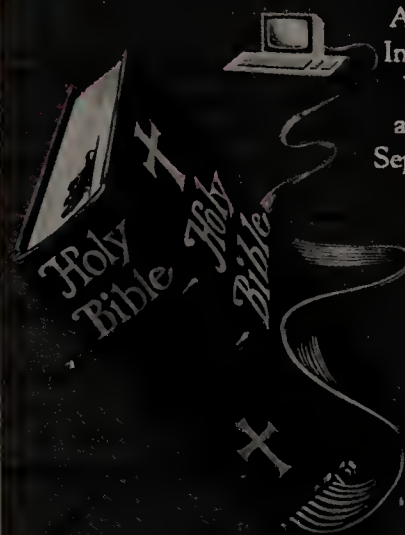
Dealer/Quantity
Discounts Available
Major Credit Cards
Accepted

CIRCLE 578 ON READER SERVICE CARD

New dimensions in Bible study

THE WORD processor

A comprehensive Bible study program. Instant access to any verse in the Bible. You can search for any word or phrase and build indexes to record your study. Separate windows for comparing various verses and translations. Only \$199.95



Our family of products
Choose from NIV, RSV, KJV or NKJV text. Add Greek or Hebrew transliterators or topical cross references, personal commentary, a chronological Bible and chain references. Our memory resident

VERSE TYPIST transfers verses to your word processor.

Bible Research Systems
(512)251-7541

2013 Wells Branch Parkway #304
Austin, Texas 78728

Postage extra. For IBM, MSDOS, Macintosh. Some products for Apple II.

CIRCLE 598 ON READER SERVICE CARD

Contact POWER™

FOR PROFESSIONALS

E-Z contact management system for hands-on lawyers, consultants, RE agents, mfr reps & other client based professionals.

Best yet for instant data, form letters, labels, schedules, time logs, ticklers & automatic phone work—tracks mail responses, referrals, contracts & projects—text editor for notes and letters—sports Laser printers—fast & easy. Only \$395. IBM, 384K, HD. Send \$5.00 for working demo.

(714) 838-1888 Visa/MC
Parkside Computer Systems
1241 Landfair #C, Santa Ana, CA 92705

CIRCLE 467 ON READER SERVICE CARD

Church Applications

Parish Data System™

Comprehensive census/contribution program. Easy to operate, menu-driven. Family, member, financial info & reports fully integrated. Selective listings, labels; contribution, tuition statements; personalized letters. User can create own reports, letters. Other church programs available. Over 2500 users.

Parish Data Systems, Inc.
3031 W. Northern Ave. #121
Phoenix, AZ 85051
602/247-3341

Church Mgm't Systems

Easy-to-use, flexible & integrated. Network version available. Local representatives & toll-free support back a comprehensive line of Church & School products. 1200+ satisfied Church, School & Government users. Full demo available. Write or call.

The Software Library
3300 Bass Lake Rd.
Brooklyn Center, MN 55429
800/247-8044, 612/566-4212

ICMS

Most of our clients investigated or even tried the alternatives, but, in the end, they chose the **Integrated Church Management System**. We've been providing state-of-the-art church software and support for over six years. Call for a demo.

Omega C.G. Limited
377 East Butterfield Road, #675
Lombard, IL 60148
312/969-7799

CIRCLE 556 ON READER SERVICE CARD

CHURCH SOFTWARE

POWERCHURCH PLUS!®

Fast, friendly, reliable church administration system. Membership, full fund accounting, contributions, payroll, payables, multi-user support, & much more - **ALL** for \$695 complete! Compare us feature-for-feature against any overpriced package. We're helping thousands of churches with great software at a great price! **FREE** phone support, no time limit. No high-pressure sales pitch. To order your **FREE** full-working **DEMO** version, call Customer Support.

F1 SOFTWARE
P.O. BOX 3096 BEVERLY HILLS, CA 90212
(213) 854-0865

CIRCLE 562 ON READER SERVICE CARD

AGC Church Systems

Interactive modules for church administration since 1981. **OFFICIAL** system for many denominations. Powerful Query w/word processing & spreadsheet interface. User groups (1,700+ Users). Semi-annual updates, toll-free support, Quick-Train Learning System, help screens, networking. No-risk demo.

AGC Corporation
1601 AGC Drive
Cleveland, TN 37312
800/873-7435, (800)/USER HELP

Communications

Computer-Telex-Link

Use your computer for telex communications! Replace that old telex machine with your PC & Cawthon's Computer-Telex-Link. Save Money! Save Time! Increase Productivity! Cawthon's Telex-Link is easy to install & easy to use. Since 1978 Cawthon has been linking computers to U.S. & overseas telex services. Many satisfied customers. Excellent support.

Cawthon Scientific Group
24224 Michigan Ave.
Dearborn, MI 48124
313/565-4000. Telex: 4970016
CAWTHON

COMPUBIBLE

• **OUR FAMILY OF PROGRAMS HAVE MORE FEATURES THAN ANY OTHER PROGRAM OR YOUR MONEY BACK!**

• Find any word or phrase in seconds!

• Access the Bible, insert verses and find words or phrases while using your word processor!

• KJV, ASV, NIV, NKJ, RSV
For information on all products call or write:

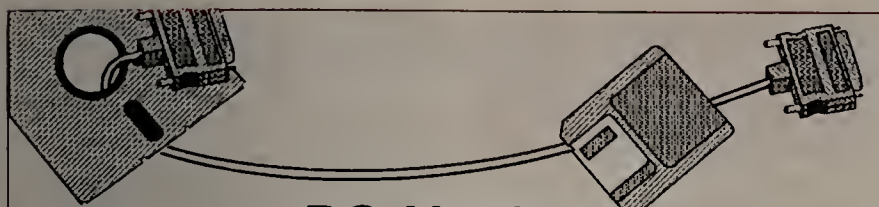
NASSCO P.O. BOX 65600-222
Lubbock, TX 79464
(806) 866-4223 (800) 262-7726

CIRCLE 514 ON READER SERVICE CARD

CATALOG

PC WORLD

Shop The PC World Catalog for fast solutions to your PC needs.



PC-Hooker

Bridges the Gap and MORE

PC-Hooker connects any two IBM-PC compatibles (XT, AT, PS2, all laptops) and transfers files at speeds over 115,000 baud through the universal serial cable. Faster transfers are possible with the optional parallel cable.

PC-Hooker bridges the gap between 5¼" and 3½" systems, but is also great for DOS file and disk management. Standard features include:

- Bi-directional file transfers up to 115,200 baud
- Parallel transfers exceeding 200,000 baud
- Disk/file management, e.g. Dirtree, Sort, Find, View...
- Complete text editing
- Print capability for text files or directory listings

PC-Hooker includes everything you need for fast and easy file transfers for only \$79.95. **PC-Hooker PLUS**, with Hayes modem support is \$99.95. Do everything in the background with **PC-Hooker TSR** for \$129.95.

AMICA

FREE

For a limited time, get a parallel cable free with **PLUS** and **TSR**.
1-800-888-8455

CIRCLE 503 ON READER SERVICE CARD

Construction

Construction Management

Affordable, understandable software for builders. Job cost, billing time & materials or percent complete, payables, change order & retention tracking in one package. Prints checks, statements, bids, 30+ reports. Clear manual & help windows, backed by our professional phone support staff. \$795.

Yardi Systems, Inc.

813 Reddick St.

Santa Barbara, CA 93101

805/966-3666

Data Base

SQL/QBE, dBase & Lotus

dQUERY 2.1 is an interactive query system & report writer on dBASE & LOTUS files using SQL (IBM DB2 compatible) & Query-By-Example. Its nice windowing facilities let users easily do ad hoc queries on their dBASE & LOTUS Files. \$150. dQUERY/lib is a C-callable SQL lib (dQUERY 2.0 included). \$295. \$5 s/h.

Quadbases Systems Inc.

790 Lucerne Drive #51

Sunnyvale, CA 94086

408/738-6989

Bookends PC

Bookends™ is a specialized database for managing your references. You can quickly put your finger on any article from books, journals or newspapers. When it comes time to print your bibliography, Bookends outputs your bibliography in almost any style without reentering references. \$149.95

Sensible Software, Inc.

335 E. Big Beaver, Ste. 207

Troy, MI 48083

313/528-1950

Data Entry

Data Entry Emulator

Fast, accurate heads-down data entry & two-pass verification for PCs. Quick/easy formatting. Features include: auto-dup, constants, format chaining, range checks, table look-ups, operator stats, a complete edit language inc, Rev 10 key option. Lots more— Free 30 day trial. PC's \$395.

COMPUTER KEYES

21929 Makah Rd.

Woodway, WA 98020

800/356-0203, 206/776-6443

fax 206/776-7210

A Data Entry System Perfect Enough to Satisfy Type "A" Personalities.

If you demand the same accuracy, perfection, and hard work from your data entry software as you do from yourself, then **RODE/PC** is your type of product. **RODE/PC** is a type "A" solution for people who insist on easy application design, powerful validation, two-pass and trail verify modes, exceptional conditional processing, full record output control, complete system management facilities, data security and much more. **RODE/PC** is an extraordinary product to meet extraordinary requirements.

Like **RODE/PC**, your hardware must be right for today and ready for tomorrow. **DPX** recommends **RODE/PC** with the IBM® Personal System/2® products. They feature an integrated system design and the quality and dependability you expect from IBM. Along with the IBM OS/2®, the Models 50, 60, 70, and 80 offer the exclusive "IBM Micro Channel™" Architecture.

See for yourself why 6 of the 10 largest companies and thousands of others in the US have selected **RODE/PC** as the ultimate PC data entry solution. Our customers say "**RODE/PC** is a beautiful product, designed by people who clearly understand the market." Call us to discuss your data entry plans and ask about our evaluation program.



DPX/IDEAS

Data Entry Division

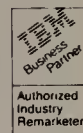
20823 Stevens Creek Blvd., Suite 130

Cupertino, CA 95014

(408) 973-9292

IBM, Personal System/2 and OS/2 are registered trademarks and Micro Channel is a trademark of International Business Machines Corporation

CIRCLE 558 ON READER SERVICE CARD



KeyEntry III®

Multi-User Data Entry System. A complete data entry system for multiple users running in a LAN, or in a stand-alone environment. Provides all necessary tools for designing data entry applications, controlling data flow, & monitoring/reporting operator activity & performance. Complete evaluation copy (all programs & documentation) avail. Call for your copy today!

Southern Computer Systems, Inc.

2732 Seventh Ave. South

Birmingham, AL 35233

800/533-6879, 205/251-2985

VDE-Viking Data Entry

The premier data entry system. Full-featured to replace key punch & keydisks. Full screen "FORMS", double-key verify, wide variety of options, crossfoots, subtotals, batch balancing, duplicating, statistics, skipping, etc. Character, field & record level validations. \$120-600. Also for minis.

Viking Software Services, Inc.

2815 East Skelly Dr.

#816, Tulsa, OK 74105

918/745-6550

Desktop Publishing

SPOT pointe erkennen

A revolutionary OCR program that can read printed characters in over 100 languages. Your PC can now read books, magazines, journals, newspapers, contracts, invoices, government publications, manuals, typewritten articles and documents. SPOT works with most low cost desktop image scanners and can read a page in less than one minute using an 80386 PC. SPOT can be trained to read almost any printed character set with high accuracy. SPOT is only \$995. Call today!

FLAGSTAFF ENGINEERING 602-779-3341
FAX 779-5998

CIRCLE 580 ON READER SERVICE CARD

CATALOG

PC WORLD

Shop The PC World Catalog for fast solutions to your PC needs.



Desktop Publishing Software

- TABIN for WordPerfect, Ventura, PageMaker** \$99
- Replaces spaces with TABs to create great looking tables (with proportional fonts) from Lotus, Paradox, DB3, ASCII, etc.
- HEADLINE for Ventura, PageMaker, WordPerfect** \$185
- Create dazzling special effects for headlines, logos etc. 43 samples illustrate the endless possibilities. (EPS File format)
- NEWFONT for Ventura** \$185
- Modifies existing Postscript fonts with outlines, shadows, skews.
- VENTURA UTILITIES for Ventura** \$99
- Prints style sheets, turns your Postscript printer to Diablo mode, copies Chapter files, enables special keys, +More
- LOADER for all Postscript Printers** \$59
- Loader saves time printing by downloading Adobe fonts.

COREL, 1600 Carling Ave., Ottawa, Ontario K1Z 8R7, (613) 728-8200

CIRCLE 477 ON READER SERVICE CARD

Educational

Grade Week Vacation!

Average and print out your grades with the fast, easy-to-use AEIUS GRADEBOOK V2.4. Won Classroom Computer Learning Magazine's 1988 Software Excellence Award. Free literature. Shareware disk with tutorial only \$10 ppd. Program, printed manual, phone support, and updates for only \$35 ppd. Visa/MC. AEIUS CORP.
PO Box 700457
San Jose, CA 95170
408/257-0658

PC-Quizzer

Courseware Authoring System. Ideal for home & School. Ask Multiple Choice, True/False, Fill-in & K-type questions. Menu driven, Windows, Music, Speech, Color Text & Graphics. 256 colors on PS/2. Many other features. Improve Grades for only \$59. A Site license is available. \$3 s/h. MC/VISA.
Data Assist
6555 Busch Blvd, #148
Columbus, Ohio 43229
614/847-8348

New GRADEBOOK II!

The comprehensive grade analysis software-handles 200 students/class, any number of classes. Calculates course grades your way. Predicts course grades. Calculates statistics. Ranks students. Posts grades. Averages. Alphabetizes. Corrects grades/auto corrects averages. Progress reports. And more! \$49.50
Wren Software Inc.
Dept. W
PO Box 1138
Castle Rock, CO 80104

Learn Programming

Beginners interactive diskettes with SAMPLES & SOURCE:

- CLP_TRN1 for Clipper
 - FOX_TRN1 for Foxbase +
 - DB3_TRN1 for dBASE III +
- Learn by doing—draw Boxes, Menus, create Files, Indexes, Sort & Edit data. Introductory price \$79 each + \$5 s&h (List \$99). Or DEMO \$10 incl. s&h, \$10 applied to purch. Check/MO:
BKC SYSTEMS, INC.
32-19 201 Street, Dept. PCW
Bayside, NY 11361
718/428-0174

Engineering

Simulation

GPSS/PC is a full-power version of GPSS, the most popular mainframe simulation language. Specifically designed for interactive use on today's high-speed microprocessors, it is loaded with features such as interactive graphics & animation. Using GPSS/PC, predict the behavior of complicated real-world systems.
Minuteman Software
PO Box 171/W
Stow, MA 01775-0171
800/223-1430 x315, 617/897-5662 x315

Eng./Sci. Graphics

Engineering/scientific graphics. OMNILOT [S] (screen graphics) & OMNILOT [P] (plotter driver) provide integrated eng./sci. 2D & 3D graphics w/NO PROGRAMMING! Menu-driven, flexible, professional. Choice of formats: tabular/line, contour, 3D wireframe & more! OMNILOT [S]: \$195. Add [P]: both \$295.
Microcompatibles
301 Prelude Drive
Silver Spring, MD 20901
301/593-0683

Entertainment/ Games

STATBOOK SERIES

Features include printing of player/team game, y-t-d & lifetime stats; team/league leaders & team standings. Number of players/teams limited only by disk space. Ideal for high school, college, amateur and professional teams/leagues. Football \$69, baseball/softball \$69, basketball \$59 and hockey/soccer \$59. Also league scheduler \$55. MC/Visa.

RJL Systems
106 New Haven Ave.
Milford, CT 06460
203/878-0376

Sports Handicapping

\$\$WIN with horse racing & greyhound handicapping software—\$32.95, \$52.95, \$67.95, \$77.95 each. Up to 17 entries analyzed: class, speed, times, odds, track, post, stretch, & finish. Pro Football, Baseball, Basketball Software—\$52.95. Handicap races & games in minutes. MC/VISA accepted. Free info.
SOFTWARE EXCHANGE
PO Box 5382-PW
W. Bloomfield, MI 48033
313/626-7208. Orders: 1-800/527-9467

Love Problems

Try **STARPANION™** - The program that tells you your astrological compatibility with someone else. Simply enter birthdays or signs and STARPANION™ gives you an astrological profile of the match. Rates mental, emotional, spiritual, money, and sexual compatibilities. STARPANION™ quickly checks the compatibility of mates, colleagues, clients, friends, bosses or anyone you want to know how you match with. Office's love this program. For IBM PC, XT, AT or compatibles. 60K required. Not Copy Protected. Visa and MC orders call 24 hrs. 7 days/wk 1-800-442-9199 or send \$29.95 + \$2.00 P&H to: Century Systems, P.O. Box 43725, Dept. T20, Atlanta, GA. 30336 Ask for it at your software store.



HI-TECH LOTTO ANALYZER

Quality Computer-Assisted Number Analyzer

You make your analysis and choose your game-play numbers from computer calculated displays and reports. Data is based on your state's winning number history, using hi-tech statistical methods. You update weekly. Min. 256K. Programs, manual, one state's data, \$44.95 + \$3.00 shipping and handling. Each additional state \$10.95. Credit card: 800/992-4045, ext. 439 (CA); 800/331-5236, ext. 439. Check/M.O.:
The LOTTO EDGE, ODDS UNLIMITED,
P.O. Box 1223, Addison, IL 60101

PLAY TO WIN
LET YOUR PC DO THE WORK!

CIRCLE 549 ON READER SERVICE CARD

Win LOTTO Millions!

Lotto Picker Plus™ can give you the statistical winning edge! Finds hidden biases & picks your tiks! Works for all lotto & daily games worldwide. Multiple bonus #'s; a file editor; telephone support; & much more! For MS-DOS, C64/128, 64K Apple II. \$34.95. 3.5"-\$44.95. Add \$5.55 s/h. NY add tax.
GE RIDGE SERVICES, INC.
170 Broadway, Suite 201-PCW
New York, NY 10038
800/634-5463 ext 293.
Info 718/317-1961

NEMESIS™ Go Master™



Go, a game of rare elegance and simplicity, has been a way of life in the Orient for over four thousand years. Packed with features, NEMESIS™, the world's strongest program, is an ideal playmate and tutor. Jerry Pournelle named it game of the month twice:

"If you are interested in Go, buy this program." BYTE 7/87

\$79 for Go Master™, \$49 for Joseki Tutor™. Add \$3 S&H

Toyogo, Inc. 76 Bedford Street, #34-W
617-861-0488 Lexington, MA 02173

CIRCLE 565 ON READER SERVICE CARD

POKER

Pros play our games seriously. You can play for fun!

7 Card Stud \$54.95

Texas Hold'em \$54.95

Almost live from Las Vegas! Simulate casino or private games. Set skill levels for each of 1-9 computer opponents. Beginner to expert. Select betting limits, antes, etc. Poker Calculator™, Hand/Game Analyzer™ included. IBM/compatible, 192k, mono/color. 30-day \$\$-back. Same-day shipping. Visa/MC/COD call. Or send Check (no delay) /MO to:

The WorkWare™ Company
5130 E. Charleston, Ste. 5
Las Vegas, NV 89122
(702) 641-4931

CIRCLE 490 ON READER SERVICE CARD

CATALOG

PC WORLD

Shop The PC World Catalog for fast solutions to your PC needs.

Casino Excitement!

Centron's MASTER CASINO GAMES bring the fast-paced suspense filled action of casino gambling right to your PC. Centron, the leader in casino gambling software with thousands of satisfied customers, can improve your chances of winning. All games include complete manuals with rules and betting strategies. Beginners learn and play at your own pace without high-speed casino distractions. Experienced players can test strategies and systems without risk. Vivid graphics of game tables on either color or mono systems with 256K memory. Not copy protected.

- ROULETTE MASTER** Double 0 or Single 0 Roulette. Animated wheel spin, cursor controlled bet placement. Repeat bets with single entry for faster play.
- CRAPSMaster** Play all casino bets, including multiple Come, Odds, and Place Bets. Selectable casino rules. Feature allows preset betting strategy over a large number of rolls.
- POKER MASTER** Exact simulation of casino-style Video Poker. Selectable payoff odds. Optional window shows draw possibilities.
- BLACKJACK ACE** Three different card counting systems or design your own. 1-3 players, up to eight decks. Selectable casino rules, advice window. Repeat bets with a single entry.
- BACCARAT MASTER** Learn the fast exciting game played by the "high rollers." 1-3 players, unlimited betting. Repeat bets with single entry for faster play.

EACH GAME \$39; ANY 2 for \$69; ANY 3 FOR \$89; ALL 5 ONLY \$99. Shipping included. CALL TOLL FREE 1-800-848-2424. MC/VISA/AX

Centron Software, Inc.
7718 LaMirada Drive, Boca Raton, Florida 33433

CIRCLE 538 ON READER SERVICE CARD

ADULT SOFTWARE

For IBM PC, XT, AT PS/2 & Compatibles
World's Largest Distributor
Now-Same Day Shipping

- Volume I \$11.95 ppd
Volume II \$11.95 ppd
Volume III \$16.95 ppd
M1 thru M9 \$5.00 each ppd
Catalog Disk \$5.00 ppd

Check or money order accepted
Foreign orders & 3.5" orders add \$1.00 per disk
AOS • P.O. Box 106-PC • Marion, CT 06444

CIRCLE 461 ON READER SERVICE CARD

Financial

LOAN MAKER® \$89.95

Godfather of Loan Calculation & Amortization Programs. Instantly computes results. Used by CPAs, atty., banks, etc. Makes amort schedules for Level, Specified Amt., & Decreasing Pymts for any time period. Balloon Pymts. Save/Recall/Delete schedules. IBM/comp. Superb manual. Demo \$2; demo + manual \$20, credited on program. Visa/MC/AmEx/chk. Powder River Properties, Ltd. 1510 Stone St. Falls City, NE 68355 402/245-2029 (24 hr)

The Right Time System

The Stock, Index & Futures programs generate accurate Buy/Sell signals for individual stocks, indexes & commodities. The software was developed by an expert portfolio manager for his own personal use & are now available for any smart trader who wants to make quick profits. Call or write for free info. T.B.S.P., Inc. 2265 Westwood Blvd. #793 Los Angeles, CA 90064 213/312-0154

...INVESTORS...

\$80 CynoTech barchart & trend analysis: fast/accurate manual data entry, quickly chart price history, estimate trends to predict price direction, know change relative to market & spot support/resistance levels. CGA/EGA/MCGA graphics. DOS 2.0+. Write now for free summary. Demo disk \$5 + NY tax. Cynosure Software PO Box 65 Dept W Syracuse, NY 13209 315-468-3594

NumberCruncher™

- RAM-resident calculator with 35 functions! Basic functions. Scientific equations. Programmer calculations. Plus financial calculations, including:
- IRR • Loans
 - NPV • Annuities
 - And Much More
- Insert results into any program with a single keystroke!
IBM and Compatibles
VISA/ MC/ Amex

Good Software Corp.
13601 Preston Rd. Suite 500W
Dallas, Texas 75240
(800) 272-GOOD

CIRCLE 456 ON READER SERVICE CARD

LOAN AMORTIZATION

New AmPack Plus is a flexible loan amortization software package designed by a CPA & tax attorney. Supports variable rates, graduated, skipped, & principal-only payments. Includes balloons, negative amortization, customized reports & more. AmPack \$49.95; AmPack Plus \$99.95. VISA/MC \$5 s/h. Softflair, Inc. 8753 Park View Milwaukee, WI 53226 414/797-4490

Become A Power Investor

Our T-Bill/Eurodollar Spread & S&P 100 Spread Analysis Systems give you power! The power to decrease the waiting associated with conventional stockmarket investing & substantially increase the potential profit. For more information about Power Investing, send for your FREE BROCHURE. BUSINESS LOGIC 49 Springdale Blvd. Guelph, Ontario CANADA N1H 7S9

A Mortgage/Tize Master

Flexible enough for personal/bus. Amortizes loans, F/ARM, pnts, balloons, caps, payoffs, scheds w/ytd tots. OnLine Help, User friendly +. Tries to show what's best & more. Compares 20, stores many. \$37. W/GPM's & refinance analysis \$47. PC SQUARED (Call 24 hrs) PO Box 1508 Lindenhurst, NY 11757 516/957-2573, 800/356-5179

Loan Plus ®

Fully menu driven! User friendly! Organizes all phases of loan processing. Easy to track payts. Processes 5 types of loans incl. Rule of 78. Produces amort. sch., payt. receipts & invoices, late notices, end of yr. stmts. loan collection rpts., labels, etc. PC/MS-DOS/256K. Demo. \$9.95 + \$2 s/h. Operating System \$695. Advanced Performance, Inc. c/o The Software Place 156 Bay Area Blvd. Webster, TX 77598, 713/338-2585

Legal, Finance, Real Estate

EXEC-AMORT™

Loan Amortizer Plus Software for IBM-PC,AT,PS2 series & compatibles

- * Used by thousands of Attorneys
- * Used by hundreds of Banks
- * Used by big CPA's
- * Used Nationwide!
- * Used for Judgment/Child Pmt's
- * Used to verify lender's figures!!
- ☐ Loan Amortizations
- ☐ APR's comply to US Regulation Z
- ☐ 18 Digit Accuracy
- ☐ Fixed & Adjustable Rates
- ☐ Irregular Payments
- ☐ Points & Fees
- ☐ Prepaid Interest
- ☐ Extra Payments
- ☐ PMI Payments
- ☐ Balloon Payments
- ☐ Solve for the Unknown
- ☐ Present Value
- ☐ Future Value
- ☐ Net Present Value
- ☐ Internal Rate of Return
- ☐ Yield & Loan Price
- ☐ Easy to use menus
- ☐ User configurable rounding
- ☐ Great for client services!
- ☐ FREE Reg. Z compliance benchmark test with purchase!

Only \$149.95 + \$5 S&H.

Demo disk & manual available for \$30+\$5 S&H

ELECTROSONICS

36380 Garfield - #1, Fraser, Mich 48026

800/858-8448 or 313/791-0770

Check, Visa, MC, Amex & Discover are welcome. COD order's additional \$2.20

60 day money back guarantee!!

CIRCLE 526 ON READER SERVICE CARD

Amortizer Plus™

MORE THAN 5000 SOLD!!

- Calculate and print complete amortization schedules for any type of loan with this easy to use program. Features include:
- Balloon Payments • Negative Amortization • APR • Rule of 78's • Irregular Payments • Leases • Wrap Notes. "What if" scenarios are quick and easy.
- IBM and Compatibles VISA/ MC/ Amex

\$99.95

Good Software Corp.
13601 Preston Rd. Suite 500W
Dallas, Texas 75240
(800) 272-GOOD

CIRCLE 460 ON READER SERVICE CARD

Flow Charting

Better Flowcharter

Know before you buy! Easy-Flow is the superb flowcharting program chosen by over 30,000 users, and very favorably reviewed in the March 10th 1987 issue of PC MAGAZINE. See the "Advertisers Index" under HavenTree to find our large display add in this issue.

HavenTree Software Limited

Order Desk: 1-800-267-0668

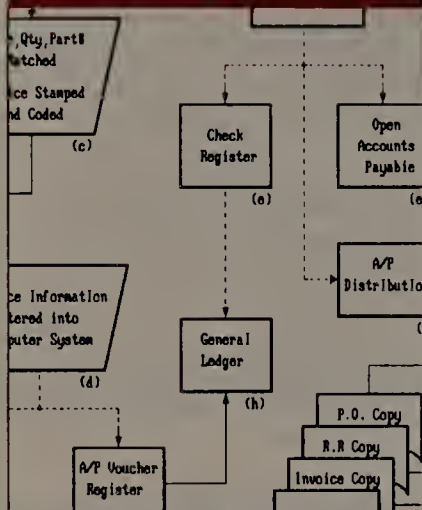
Information: (613) 544-6035

CATALOG

PC WORLD

Shop The PC World Catalog for fast solutions to your PC needs.

ARE YOU STILL DRAWING FLOWCHARTS BY HAND?



FLOW CHARTING II+

Flow Charting II+ will *amaze* you with its speed, power and simplicity.

- Update and print charts as fast as the situation changes
- See your revisions right away—no long wait for charts to be hand drawn
- Select 26 standard shapes; 10 text fonts
- Tutorial manual makes learning easy
- Runs on IBM or compatibles
- Produces excellent organizational charts!
- Only \$229!

PATTON & PATTON

Software Corporation
Excellence in charting the flow of ideas

For more information,
see your local retailer or call
1-800-525-0082, ext. 50 (outside Calif.)
408-629-5376 (Calif./Int'l.)
81 Great Oaks Blvd., San Jose, CA 95119

CIRCLE 529 ON READER SERVICE CARD

Foreign Languages

Diplomat Software Series

عربي
Ελληνικά
עברית
Русский

Use Arabic, Armenian, Cyrillic, Esperanto, European, Farsi, Greek, Hebrew, Urdu, Turkish, Vietnamese in popular commercial software:

WordPerfect, Wordstar, Volkswriter, PC-Write, Dbase, Spreadsheets, Basic, Prolog, Ventura Publisher, etc..

The Diplomat

4320 Campus Dr., Suite 114
Newport Beach, CA 92660
(714) 474-6968

CIRCLE 564 ON READER SERVICE CARD

Genealogy

FAMILY REUNION

OUTSTANDING GENEALOGY SOFTWARE for home or professional use for beginning level to serious genealogists. Allows you to keep track of living relatives as well as your genealogical research. Prints address labels, birthday lists, pedigree charts, family group sheets, descendant charts, research notes, and more! Powerful file search capabilities, user-defined data fields, exciting screen displays, flexible configuration. A superior value for only \$49.95!

FAMware™

Computer Software For The Family

1580 East Dawn Drive
Salt Lake City, Utah 84121
(801) 943-6908 / (800) 327-9835

Family Roots™

Do it YOUR way! Huge variety & capacity for your family history. Make pedigree charts & descendants charts, group sheets, person sheets, indices, histories, address labels, searches, & much more. Call for FREE information. Satisfaction guaranteed. Any PC or compatible. MC/VISA/AmEx welcome.

QUINSEPT

Box 216

Lexington, MA 02173

800/637-ROOT, 617/641-2930

Genealogical Computing

Quarterly journal with critical software reviews & discussions of state-of-the-art developments for applications in genealogy. Regular features include "Beginner's Board," "Tech Notes," interest group, database & bulletin board directories. Annual subscription \$25.

Ancestry, Inc.

PO Box 476

Salt Lake City, UT 84110-0476

800/531-1790

Graphics

35mm Slide From Your PC

COMPUTER SLIDE EXPRESS converts graphic files produced on the IBM PC into brilliant 35mm color slides with color resolution 400% better than your monitor. Leave your printouts behind. Use high-resolution color slides (up to 4000 line) at your next presentation. **COMPUTER SLIDE EXPRESS** \$9/slide.

Visual Horizons

180 Metro Park

Rochester, NY 14623

716/424-5300

FORTRAN Graphics!

Now get complete graphics support on screen, printer or plotter. Grafmatic (EGA, Herc.®), Plotmatic (HP, HI plotter), Printmatic (printer) give you 2-D & 3-D graphics support w/MS, Lahey or R/M FORTRAN. Optional font module too! \$135 each. Discount for 2 or more programs.

Microcompatibles

301 Prelude Drive

Silver Spring, MD 20901

301/593-0683

COMPU-PIX

YOUR FAVORITE COLOR PHOTO CONVERTED TO SOFTWARE FOR DISPLAY ON VGA MONITORS

- 256 Color VGA Mode 13
- Installs on Hard Disk
- One Keystroke Return to DOS

URNS YOUR BLANK SCREEN INTO A BEAUTIFUL FULL-COLOR COMPUTER DESKTOP PORTRAIT

SPECIFY 3" OR 5" DISKETTE

\$35 + \$4 S/H

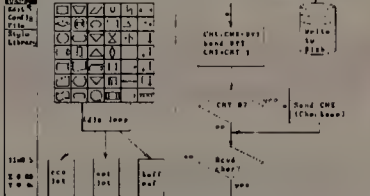
Send color photo (5x7 max) to:
(photo will be returned)

COMPU-PIX SYSTEMS CORP.
314 EAST HOLLY STREET #106
BELLINGHAM, WA., 98225
FAX: (604) 738-5118

CIRCLE 457 ON READER SERVICE CARD

TurboFlow \$69

Flowcharting for IBM PC/XT/AT/PS2



\$89 with Logitech Mouse!

- Cut/paste, drag, reduce/enlarge
- Expandable symbol library
- Drawing size to 4 pages
- Pop-up icon menu
- Support all plotters
- Curves, ellipses



Daytron Electronics Inc. (214)669-2137
610 S. Sherman #104, Richardson Tx 75081

CIRCLE 561 ON READER SERVICE CARD

ROOTS

Genealogy Software to Make Your History

ROOTS III (new!)\$250.00
ROOTS II.....195.00

CALL TODAY FOR FREE CATALOG

(800)327-6687

In California, call (415)967-1900

COMMSoft

2257 Old Middlefield Wy. Mtn View. CA 94043

CIRCLE 505 ON READER SERVICE CARD

REACH 1.1 MILLION SHOPPERS IN A SINGLE COLUMN!

With 1.1 million readers picking up PC World every month, there's no easier, faster, and more economical way to get your message across than to advertise in The PC World Catalog. Call us now and start getting your share of this valuable market!

CATALOG

Place Your Ad in
The PC World Catalog
Today...Call

800-435-7766
In CA: 800-435-7760

CATALOG

PC WORLD

Shop *The PC World Catalog* for fast solutions to your PC needs.

Graphics

RAINDROP™

FAST, flexible, easy to use, compact T-S-R utility to send screen graphics to your 9 or 24 pin dot matrix, ink jet or laser printer. Create quality b/w or color printer graphics from applications AND user written programs. Full 24 pin support. Many options. Complete driver library \$39.95.

Rainbow Technologies
8106 St. David Court
Springfield, VA 22153
703/440-0064

Health

Diet Wise-Energy Wise

Ideal for individuals interested in nutrition, fitness, weight control, or special diets. ENERGY WISE calculates calories used in exercise & daily activities. DIET WISE analyzes diets, recipes, & menus. Designed by Registered Dietitians. \$39-\$120. PC/MS-DOS. Also inquire about NUTRIPAK PROFESSIONAL version.

Nutritional Data Resources
PO Box 540
Willoughby, OH 44094
800/NDR-DIET, 216/951-6593

Analyze Diets, Menus &
so much more with The FOOD PROCESSOR II! This TOP-rated software has the best database of any system on the market today! Acclaimed by schools-colleges-hospitals-homes-fitness centers & business nationwide. 2400-3000 foods 30 nutrients. \$250. IBM-Apple-Macintosh. CALL OR WRITE TODAY FOR FREE DEMO DISK!

ESHA Research
PO Box 13028 Dept. B
Salem, OR 97309
503/585-6242/7755

Diet Analyzer

Ideal for weight control, menu planning, special diets, recipe analysis. Tracks calories, sodium, cholesterol, fiber, + 20 others for 1000 foods (incl. many fast foods) & 100 exercises. Can add more. Multi-day averages. \$49.95 + 2.50 s/h. 30 day trial. AMEX/MC/VISA/Chk. Demo disk \$5. Free catalog.

Natural Software Limited
129 Pearsall Place
Ithaca, NY 14850
800/626-2511, 607/272-0157 (NY)

Inventory Control/Management

"THE COLLECTOR"™

Serving collectors since 1979. Stamp, Coin, Doll, Train, Antique, Gun, you name it, Collectors (and your insurance co.) will love it. Holds up to 225,000 items, all sorted alph/numeric, with cost/cur val at touch of key. For PC/PCjr/XT/AT/PS2 or similar (256k). Write/call for free brochure, or \$65 + \$3 s/h thru 1988. 1/1/89 price \$85. Visa/MC. *The Third Rail*
3377 Cimarron Dr.
Santa Ynez, CA 93460
805/688-7370

Mr. QuarterMaster

Features: receipts & issues updating; inventory, reorder usage and other reports; file maintenance; issue slips/invoices; reorder points adjusted automatically or manually. Price: \$123. Manual alone with demo: \$23. Specify stockroom or retail version. Also available: Sales reporting, P.O., Estimating & Multi-whse I.C. systems. *RJL Systems*
106 New Haven Avenue
Milford, CT 06460
203/878-0376

dFELLER Inventory

A business inventory program written in modifiable dBASE source code. The menu-driven program lets you locate items by inventory name or number. It keeps track of reorder points, vendors, average cost, & other info \$150. dFELLER PLUS with Purchase Orders & History \$200. Requires dBASE II or III or III PLUS. *Feller Associates*
550 CR PPA, Route 3
Ishpeming, MI 49849
906/486-6024

Stock-Master 4.0

This commercial grade, high performance inventory system for Mfgs has Stock Status Rptg, Trend Analysis, Purchase Order Tracking, QC Rptg, Transaction History Detail Analysis, Multiple Whse Locations, Bill of Materials & Purchase Order Writing. On minis since 1978, expanded/priced for micros. Demo avail. *Applied Micro Business Systems*
177-F Riverside Ave.
Newport, CA 92663
714/759-0582

SINCE 1980

Our Order Processing software has helped distributors to increase profits Picking Tickets, Order Acknowledgements, Packing Lists, Invoices, Credit Memos, Statements and Purchase Orders You can have current information every day Fully integrated

Order Processing
Inventory Control
Backorder Management
Purchase Orders
Invoicing
Accounts Receivable
Commission Tracking
Sales Analysis

Free brochure. Demo available.
(713) 261-2220

Blue Ridge Software, Inc.
P.O. Box 640 Stafford, Tx 77477

CIRCLE 469 ON READER SERVICE CARD

Legal

L-PLOT

A metes & bounds program to quickly plot on screen, calc. area & print plats from virtually any description, measurement or scale! Features include—data editing, screen labeling & ability to send data directly to word processor, etc. IBM/Comp w/MGA, CGA, EGA. \$192.50. Visa/MC/Chk. \$15 Demo. Free info. *LAN/SCAN, Inc.*
PO Box 6863
Abilene, TX 79608
915/672-2901

Laser Fonts

\$1.50 FONTS

HP compatible soft fonts for your laser printer. Dozens of type styles, logos, digitized images & custom fonts available.

- Fixed & Proportional
- Portrait & Landscape
- Regular-Bold-Italic-Italic Bold
- Point sizes-6 to 108

For FREE catalog, contact:
EAGLE SYSTEMS
PO Box 502
Moorpark, CA 93021
805/529-6992

Languages

Mailing List Programs

dZIP & ZIP Directory

- dZIP PROGRAM
A name and address entry program. It doubles entry speed, reduces errors and saves on postage. It's fast and easy to use. Money back guarantee.
- ZIP CODE DATABASE
95,000 ZIP Codes with city, state, county, area code, time zone, latitude & longitude. Both only \$295.00.

(800) 443-8834
In CA (714) 661-5885

MELISSA Data CO.
32118-8 PASEO ADELANTO
San Juan Capistrano, CA 92675

CIRCLE 592 ON READER SERVICE CARD

LAHEY FORTRAN

If you demand the very best, then you should be using a Lahey PC Fortran Language System.

F77L-EM/32-Bit	Programs up to 4 GB on your 80386	\$895
F77L-EM/16-Bit	Programs up to 15 MB on your 80286	\$695
F77L	"Editor's Choice" PC Magazine	\$477
Lahey Personal	Full 77 Standard, Debugger, Linker	\$ 95

For porting or developing, there is no substitute for a Lahey Compiler. Call (800) 548-4778 today to discuss your programming needs.

Lahey Computer Systems • P.O. Box 6091 • Incline Village, NV 89450
Tel: (702) 831-2500 • Fax (702) 831-8123 • Tlx: 9102401256

Lahey

CIRCLE 552 ON READER SERVICE CARD

CATALOG

PC WORLD

Shop The PC World Catalog for fast solutions to your PC needs.

Mail Programs since 1981

- Mail-Track-I (\$49.95)
- Mail-Track-II (\$95)
- Mail-Track-III (\$195)
- Mail-Track-II Plus (\$195)
- Mail-Track-III Plus (\$295)
- Mail-Bulk-Rate-II (\$195)
- Mail-Bulk-Rate-III (\$295)
- Mail-Second-Class-II (\$295)
- Mail-Second-Class-III (\$395)
- 30 day money back
- Free Trial Disk
- Free Catalog

Sapana Micro Software

1305 South Rouse-PCWD

Pittsburg, KS 66762, 316/231-5023

PostWare Mailing System

Automate mail prep. Reduce postage by up to 5¢ per piece! PostWare assigns carrier route numbers, sorts by US Postal Service regs & prints labels in pkg. & sack mailing order. Sack tags, tray labels & mailing reports. Works w/dBASE III, DataEase, Smart, Power-Base & others. Also ASCII.

- 1st & 3rd Class-\$300
- 2nd Class-\$495
- Carrier Route-\$300
- Dup Detector \$200

PostalSoft

515 Division St.

LaCrosse, WI 54601-4544

800/831-6245, 608/784-3500

"The Mail Order Wizard

is one very powerful program. It offers a catalog business all the computing routines it needs-and then some!...gives new meaning to the hackneyed phrase, 'user friendly'... Written in Assembler, it operates with lightning speed... very serious software, a 'must see.'" *Catalog Age*. \$970. Demo, \$12.

The Haven Corporation

802 Madison, Dept. W

Evanston, IL 60202

800/782-8278, 312/869-3434

MR. LISTER™

Dedicated List manager for organizing customer data & automating mailouts. 14 User-Definable Fields for addresses, phone #'s, etc. Merge List with your letters/forms. Print professional Labels using your format & your labels. Select by Match or Range. Sort on any Two Fields. Be Productive & Save Time!

\$89.00 Demo \$15.00

Automated Micro

333 Cobalt Way, Suite 107

Sunnyvale, CA 94086

408/245-0350

Maintenance Management

Maintenance & Inspection

An integrated maintenance management system, including parts inventory, with clients in Fortune 500 companies, utilities, hospitals, schools, manufacturing & service industries etc. The online system provides operational, planning & analytical reports such as work orders, schedules, skill & inventory requirements; budget reports & reports that summarize history of work performed.

Penguin Computer Consultants

PO Box 20485

San Jose, CA 95160

408/997-7703, Fax: 408/927-0570

Manufacturing

MINI MYKE

ENTRY LEVEL MANUFACTURING SYSTEM for make to order, make to stock, process & repetitive mfg. Fully integrated acctg/dist/mfg syst costs \$5790. EASY to install & use—expands with options—grows to full MYTE MYKE MRPII system without loss of investment. Avail on PCs, Novell, Xenix, UNIX.

M & D Systems, Inc.

3885 N. Buffalo Rd.

Orchard Park, NY 14127

716/662-6611

MFG. Control System

A comprehensive system for repetitive or job shop type manufacturers consisting of: B/M, Inventory, Order Processing, Purchasing, Mat. Req. Planning MRP, MPS, Shop Floor Ctrl. & CRP, Cost devel., Job & W/O Costing, Accounting. 1 yr. warranty included. Train & consult avail. Compare our system & prices for best value.

Production Systems Inc.

526 South E St.

Santa Rosa, CA 95404

707/526-1294

Medical

Medical Systems w/ECS

All PPM products have electronic claims submission (ECS) to Medicare & commercial carriers, paper claims too.

*PC*CLAIM \$89.95, claims only.

*PC*CLAIM w/ICD's, CPT's & HCPC codes \$229.95.

*PC*CLAIM PLUS claims only w/patient file. Complete a claim in one minute \$459.

Physicians Practice Management

350 East New York

Indianapolis, IN 46204

317/634-8080, 800/428-3515

Medical Systems w/ECS

*THRESHOLD™ \$1,995 claims, A/R, patient billing. *THRESHOLD \$3,995 claims, A/R, patient billing, complete practice mgt. statistics, analysis. *CLAIM*NET Nationwide claims clearinghouse. Full 100% credit on product upgrade.

PC*CLAIM & PC*CLAIM PLUS both house 30-day \$ back grts. IBM PC/XT/AT/comp., MS-DOS, 256K.

Physicians Practice Management

350 East New York

Indianapolis, IN 46204

317/634-8080, 800/428-3515

Medical-Dental w/ECS

American Medical Software's Medical-Dental Office Management Systems (\$2,495) & Office Billing Systems (\$1,495) are easy to use on any IBM PC-XT-AT-PS/2-compat. Multi-user capabilities & exceptional support services are standard. Save \$\$\$ on IBM or Tandy hardware & financing with purchase.

American Medical Software

PO Box 236

Edwardsville, IL 62025

800/423-8836, 618/692-1300

Practice Management

MD VersaForm, the most flexible patient accounting and insurance claims package. Programmable and fully customizable, includes complete database management system. Customized reports, files, and screens. Full source included. LAN support. Dealers wanted. \$995 for single user. Free literature and demo disk.

Applied Software Technology

591 W. Hamilton Ave. Ste 201 Dept.

86

Campbell, CA 95068

(800) 678-1111 ext 86.

Music

Good Sound Advice!

Beginner, professional, solo or ensemble—Soundware carries the best MIDI products for your musical needs. Our commitment is providing you with the best product information, values and ongoing support available. Complete MIDI starter packages from under \$250! Call today for our FREE CATALOG and latest prices.

(800) 333-4554

Good Anywhere in the U.S.

soundware™

□□□□□□□□□□□□□□□□

200 Menlo Oaks Dr., Menlo Pk., CA 94025

(415) 328-5773

CIRCLE 483 ON READER SERVICE CARD

SongWright IV

Music Processor prints professional sheet music, songs, scores with text, chords, symbols. Compose, edit, copy, record, transcribe, play, transpose to any key. Bass/treble, multiple staves, all meters. MIDI optional. IBM/Epson/Star printers; CGA/Hercules graphics. \$89.95. Send for free sample output.

SongWright Software

Route 1, Box 83

Lovettsville, VA 22080

703/822-9068

Music Reader 1.0

STUDENTS & MUSICIANS Increase your musical note reading speed & learn which notes are sharp & flat in all keys. Ages 10-Adult. Not a music player program. Not copy protected. For IBM/comp w/CGA card. Installable on hard disk. 30 day money back guar. \$39.95 (+ \$3. s/h). FL residents add 6% sales tax.

STAFF

PO Box 593508

Orlando, FL 32859

407/260-3550

notesworth

The world's most unique TeleMuse service for songwriters, publishers, musicians or anyone else predisposed to Muse. For FREE info, ring 201/853-8509 via modem (300/1200/2400) 8/1/N or call 201/853-8593 for the voice or write:

notesworth

PO Box 388

W. Milford, NJ 07480

CATALOG

PC WORLD

Shop The PC World Catalog for fast solutions to your PC needs.

Public Domain/ Shareware

**\$1.00 PER DISK
75¢**

**20 TOP IBM PC PD/SW DISKS
(360K) ONLY \$15 + \$3 S&H**

QubeCalc, EDRAW, AutoMenu, Math Tutor, PC-DOS Help, Baker's Dozen, Languages, EZ-Form, PC-Style, PackDisk, PC-Stock, KidGames, Best Games, Home Inventory, PC-Outline, Form Letters, ImagePrint, SideWriter, PC-Prompt, Best Utilities.

BRIGHT FUTURES Inc.
Dept. PCW
P.O. Box 1030
East Windsor, CT 06088

WRITE FOR FREE CATALOG or
CIRCLE 453 ON READER SERVICE CARD

**COMMERCIAL QUALITY SHAREWARE
FOR ONLY \$14.95 + \$3 S&H
YOU'LL RECEIVE**

PC WRITE v3.0, EZ FORMS, PC MONEY
AUTOMENU, EZ SPREADSHEET, HELP DOS,
VIRUS PROTECTION/DETECTION SOFTWARE

**5 BLANK DISKETTES
1 YEAR MEMBERSHIP
20% OFF ALL OUR SOFTWARE
COMPLETE CATALOG UPDATES**

CCS, INC.
309 RUSSO DRIVE
HAMDEN, CONN. 06518
(203) 248-4241

CALL OR WRITE FOR OUR FREE CATALOG

CIRCLE 524 ON READER SERVICE CARD

IBM SOFTWARE

AS LOW AS \$1.50 PER DISK

CALL OR WRITE FOR
FREE CATALOG
1-800-634-0989
ADAMS SOFTWARE
801 Henryetta, Suite 2
Springdale, AR 72764

CIRCLE 493 ON READER SERVICE CARD

california FREEWARE

ONLY \$2.99 per disk! ONLY \$2.99 per disk! ONLY \$2.99 per disk! ONLY \$2.99 per disk!

Public Domain Software and Shareware for IBM™ and Compatibles DOS™ 2.1 or higher
Programs and Utilities to meet all your computing needs

ADULTS ONLY

- ADULTS ONLY 1.1** (147) - German made, great animated graphics. CGA required.
- X-RATED PRINTMASTER** (149) - X-Rated graphics for Printmaster or Plus Order Disk #160 for Printshop Version.
- INTERSECTION V1.01** (281) - Plays like an x-rated monopoly game. NEW...
- GET LUCKY V2.26** (647) - Adult entertainment package featuring trivia & poker. CGA required.
- FANTASY 773** - A text fantasy created for you by answering a few questions about you & your partner. NEW...

BUSINESS

- EZ-FORMS Rev. 016** (66) - Menu-driven forms generator, misc. skeleton forms.
- FAST RUCKS V3.1R-C** (191) - Menu-driven home finance package.
- EXPRESS CHECK V2.14** (561) - Menu-driven home checking account system.
- EASY PROJECT V3.0** (440) - A complete project management system, 1000 tasks, 100 sub-tasks, & much more. NEW...
- RENTAL MGR V2.03** (585) - Menu-driven, does credits, debits, reports, handles up to 9604 rental units.
- MANAGEMENT TOOLS** (643) - 10 programs for managers / supervisors. A mini-management course. Great!
- PAINTLESS ACCOUNTING V2.60** (774-776) - (3 disk set) A fully integrated menu-driven accounting package.

COMMUNICATIONS

- RERS BULLETIN BOARD V17.1A** (613-616) - (4 disk set) Turn your computer into a RERS. Industry standard. NEW...
- MODEM V3.1** (293 & 294) - (2 disk set) Full featured modem program.
- PROCOMM V2.42** (53 & 54) - (2 disk set) Menu-driven modem program, still one of the best.

DATABASE

- FILE EXPRESS V4.22** (33 & 34) - (2 disk set) Menu - driven database, report generator, many features. One of the best database programs on the market!
- PC-FILE V2.0** (493-495) - (3 disk set) Full-featured database, help screens, menus, macros. Excellent! Buttanware. Hard drive required.

EDUCATION

- PIANOMAN V4.00** (4 & 5) - (2 disk set) Turn your PC into a piano, create & edit music. CGA or monochrome.
- GRADE GUIDE V3.00b** (118) - A versatile program for storing, retrieving & analyzing students grades.
- THE WORLD V2.9 & WEADATA V2.0** (127) - Display maps of the world. CGA. EGA required.
- PLAY 'N LEARN V2.01** (624) - Contains 7 games designed for kids up to 6 years old. CGA required.

GAMES

- BLACKJACK GAMES** (95) - 3 advanced blackjack games, multiple players/ setup. CGA or Hercules.
- SOLITAIRE** (211) - 4 different games. Nice graphics. CGA required.
- SUPER PINBALL** (212) - 5 different games. CGA required.
- 3-D CHESS V1.01** (215) - Excellent chess game. Switch between 2-D & 3-D. CGA or monochrome required.
- EGA-TREK** (677) - Star-Trek with super graphics. EGA required.
- CYRUS** (691) - Great chess game, 16 levels, neat graphics. EGA required.
- CAPTAIN COMIC** (755) - Arcade style adventure game with super graphics. EGA required.

GRAPHICS

- FINGERPAINT V2.00** (282) - Great paint program, easy to use. CGA, EGA, or monochrome.
- PRINTMASTER** (319, 549 & 550) - (3 disk set) Over 440 misc. graphics for Printmaster/Plus. Requires Printmaster or Plus. For Printshop Graphics. Order disks # 320, 589, 590 respectively.
- PC DRAFT II V3.20** (629) - A painting/drafting program most useful for producing clip-art for desktop publishing applications. CGA required.
- PC-KEY-DRAW V3.61** (748-751) - (4 disk set) Combines features of a CAD & paint program for power/flexibility. Includes a full graphical database called HYPERDRAW. NEW...

NOVELTY

- YOUR PERSONAL POET** (718) - Create your own poem from a variety of choices & print it. NEW...
- NUMEROUS DOS TRICKS** (236) - Various tricks to play on your friends. A must for any user.
- CROSSWORD CREATOR V3.30** (422) - Design, solve & print professional looking puzzles. NEW...
- PC-BARTENDER V2.00** (619) - Recipes for approx. 200 drinks. Search by drink, ingredients, adjust sizes, etc.
- LOTTO # GENERATOR** (159) - Win big bucks in 6/49. Data to 12-10-88. NEW...

SPREADSHEET

- LOTUS LEARNING SYSTEM V2.4** (769 & 770) - Explanations, illustrations, & practice sessions. Tutor. Does NOT require Lotus. NEW...
- QUBECALC V3.02** (591) - A 3-D spreadsheet program, turn rows into columns, import lotus files, 44 predefined functions & more. NEW...

UTILITIES

- SIM-CGA V4.0** (220) - Great for most programs that need color (CGA) to run.
- DOS TUTORIAL V4.4** (256) - Menu-driven tutorial that teaches DOS commands, terms, etc.

CIRCLE 544 ON READER SERVICE CARD

A Notice from Rolodex Corp

ROLODEX® is the legally registered trademark of Rolodex Corporation. Do not use our name on your product, and be aware we protect our Registered Trademark with legal strength. For information on usage contact:

ROLODEX CORPORATION
245 Secaucus Road, Secaucus, NJ 07096
201-348-3939

FREE! IBM SOFTWARE CATALOG over 32 pages!

Best Bits & Bytes
P.O. Box 8245-W
Van Nuys, CA 91409

Toll Free — 24 Hrs.
1-800-245-BYTE
within California
1-818-781-9975

CIRCLE 576 ON READER SERVICE CARD

**SAVE
ON IBM
SOFTWARE!**

We have hundreds of quality programs for your IBM PC, XT, AT, PS/2, or compatible from just \$2 each. Both 5¼" and 3½" formats available. For your free 28 page catalog.

CALL OR WRITE TODAY!

SOFSOURCE
P.O. Box 828
East Lansing, MI 48826

FREE CATALOG
1-800-338-2118

CIRCLE 466 ON READER SERVICE CARD

Real Estate

• **Property Mgt Plus/89** •
New version which looks up tenants & posts rent by Tenant Name. Prints.. Bank Deposit Slips, Rent Statements, & Automatic Checks. Reports.. Late Rents, Vacancies & Expired Leases. Posts Management Fees, Pays Owners & does 1099s. Saves up to 80% of accounting time & is the EASIEST system to use! Special pricing from \$475.
Realty Software
133 Paseo de Granada
Redondo Beach, CA 90277
213/372-9419

Management & Analysis
• "Real Property Management" \$395/\$595 for residential & commercial properties & other bookkeeping. Flags delinquent tenants; prints budgets, checks, invoices & 1099s. No retyping of recurring data.
• "Real Analyzer" \$195 for deciding when to buy, sell, exchange, or refinance.

Visa/MC. 30 day money back.
Real-Comp Inc.
PO Box 1210
Cupertino, CA 95015
408/996-1160

Property Managers
Easy-to-use software: RENTAL MANAGER - general purpose accounting for apartments, storage units, etc. Built-in gen. ledger. CONDO MANAGER - for community associations. Member payments & charges. Accounting reports. RESORT MANAGER - for units rented on behalf of many owners. Timeshare, reservations, statements.
COLEMAN BUSINESS SYSTEMS
3654 Arcadian Drive
Castro Valley, CA 94546
415/581-7125

CATALOG

PC WORLD

Shop The PC World Catalog for fast solutions to your PC needs.

Property Management

Comprehensive program for managing residential & commercial properties. Many management reports including operating statement, delinquent rent, lease expiration & transaction register. Provides check writing, check reconciliation, posting of late fees, recurring expenses—\$495. Investment analysis—\$245.

Yardi Systems, Inc.

813 Reddick St.

Santa Barbara, CA 93101

805/966-3666

Property Management

Since 1978 over 7,000 users of our software have found it comprehensive, flexible & easy to use. We offer systems to manage the following types of properties: COMMERCIAL/RESIDENTIAL/CONDOMINIUM/HOME OWNERS ASSOC./MINI-STORAGE FACILITIES. For more info & sample print-outs call:

Realty Automation, Inc.

11365 Eastshore Drive

Hayden Lake, ID 83835

208/772-3259

Property Management

Software for owners of apartments, mini-storage, condos, duplexes, foupleses, single family, & office complexes. Provides instant cash flow analysis, records expenditures on each unit. Prints summary reports, user selected expense categories. Amortization & depreciations schedules included.

Tomar Productions

PO Box 740871

Dallas, TX 75374

214/750-1212

Sales/Marketing

SALES PRODUCTIVITY MULTIPLIED

MANAGES YOUR: Contact list, Appointments, Expenses, To-do list, Call backs, Sales forecast, Price list, Contact history, Optional factory/purchase orders.

GENERATES: Customized quotes, Follow-up letters, Labels, Custom management reports, Mail-merge files

ADDITIONAL FEATURES: Menu driven, FAST, Autodials phone, User definable fields, Supports color monitors, On-line help screens. Single user & LAN Versions, Password protection, Money back Guarantee

Sales Manager I & II

For FREE
Demo Version
(800) 222-4699
Houston (713) 728-2653

By
**PROFESSIONAL
COMPUTER
SOLUTIONS**
P.O. Box 35709
Houston, TX 77235-5709

CIRCLE 478 ON READER SERVICE CARD

Security

HANDS OFF THE PROGRAM® PC SECURITY



HANDS OFF THE PROGRAM is an all software, privilege based, system security utility that prevents unauthorized access of your PC's subdirectories, files and disk drives.

HANDS OFF THE PROGRAM provides a sophisticated technique to separate up to 64 users of a PC, by privilege, into their own separate areas on the hard disk. Users may access only their own areas and any other area protected with a lower privilege.

HANDS OFF THE PROGRAM protects files on your hard disk by preventing unauthorized users from modifying the DOS file attributes (Read Only, Hidden, System). For example, use the READ ONLY attribute to prevent virus programs from invading your system.

HANDS OFF THE PROGRAM restricts access to your hard disk via "disk locking". A "locked" hard disk may not be booted, accessed by applications software or formatted via the DOS FORMAT command until it is "unlocked".

HANDS OFF THE PROGRAM incorporates advanced security techniques on PC's running PC-DOS V3.0 or higher. The DOS FORMAT of Drive C is prevented while the PC is in use, the security manager is protected against Control Break and a boot from floppy results in the automatic locking of Drive C.

HANDS OFF THE PROGRAM also provides:

- Disk Encryption
- User Access Reporting
- Stops Common Viruses
- Mailbox
- Read Only and Execute Only privileges by user
- Auto Installation

Price **\$89.95**

add 3.75—shipping.

Check, Money Order, VISA, MC accepted.

Systems Consulting Inc.
412-963-1624

Box 111209, Pittsburgh, PA 15238-0609

CIRCLE 567 ON READER SERVICE CARD

EVERLOCK



COPY PROTECTION

Designed for user-transparency, clone compatibility & strength. It features:

- no need for damaged media or I/O plugs
- thwarts all Bit-copy Software
- supports all Hard & floppy Disk formats
- restrict or allow Network installs
- allows protected upgrades by modem/BBS
- limit program use by Date or #Executes
- remotely reset Installs or Expiration

\$195 Starter Kit or \$495 with NO meter counts. Free info & demo disk available.



Az-Tech Software, Inc.
305 East Franklin
Richmond, MO 64085

(800) 227-0644

(816) 776-2700

CIRCLE 593 ON READER SERVICE CARD

Statistics

SOLO

NEW from BMDP. Menus & fill in the blank panels make SOLO so easy & so flexible. At \$149, SOLO offers the best stand-alone solution for 3D rotational graphics, spreadsheet data entry, all the standard statistical procedures, & much more. Free suppt. Guaranteed. Call for details & order today.

BMDP Statistical Software, Inc.

1440 Sepulveda Blvd. #316

Los Angeles, CA 90025

213/479-7799, Fax: 213/312-0161

NCSS-5.0

ALL NEW spreadsheet style. Multiple & stepwise regression, ANOVA, time series, discriminant, factor, cluster, principal components, t-tests, contingency table, nonparametrics. Easy interface to Lotus, dBASE, etc. Sort, join, merge data base. \$99. Visa/MC.

NCSS-PC

865 East 400 North

Kaysville, UT 84037

801/546-0445

NEW
VERSION

StatPac Gold

Award Winning Statistics And Forecasting Package

- Complete data management
- Basic and advanced statistics
- Tables, windows and graphics
- Utility program library

Call now for a free brochure
1-800-328-4907



WALONICK ASSOCIATES
The PC Statistics Pros

6500 Nicollet Ave. S., Minneapolis, MN 55423
(612) 866-9022

CIRCLE 537 ON READER SERVICE CARD

MINITAB'S a PC of cake!

MINITAB features intuitive commands for comprehensive data analysis. Includes basic statistics • regression • time series • tabulation • ANOVA • plots • histograms • much more. DOS based version includes LOTUS interface, hi-res graphics, no copy protection. Used in over 60% of Fortune 50 companies. For free brochure call 814/238-3280.

MINITAB
STATISTICAL SOFTWARE

Minitab, Inc.
3081 Enterprise Dr., State College, PA 16801

CIRCLE 566 ON READER SERVICE CARD

StatPlan III

Easiest to use statistics program available. Complete range of statistics: curve fitting, crosstabs, correlation, multiple regression, t-tests, time-series analysis, etc. Graphics with printer/plotter output. Capable of handling up to 50,000 data points. Interfaces with Lotus files. Demo disk available. \$179.

The Futures Group

76 Eastern Blvd.

Glastonbury, CT 06033

203/633-3501

STATISTIX II

Comprehensive, powerful and incredibly easy-to-use. Full screen editor, transformations, linear models (ANOVA, regression, logit, PCA, etc), ARIMA, most standard stat procedures. Clear, well organized documentation. Satisfaction guaranteed. \$169 PC DOS, \$99 Apple II.

NH Analytical Software

PO Box 13204

Roseville, MN 55113

612/631-2852

Forecasting is EASY

with PRO*CAST 2.0. All you need to know is your past history. Complete time series analysis from linear trend to Box-Jenkins. Auto/manual modes. Built-in editor. Reads .WKS & ASCII. Great graphics! Not copy protected. \$295 with 30-day money back guarantee. Demo \$10.

Fleming Software

PO Box 528

Oakton, VA 22124

703/591-6451

Expert Forecasting

Is a cinch with AUTOCAS. Simple menu operation gives accurate, reliable forecasts automatically. Based on proven, expert methods. Options for adjusting extreme values in historical data, simulating forecast accuracy, confidence limits, graphics & much more.

Not copy protected. Site licensing, quantity discounts.
MC/VISA.

ONLY \$149⁰⁰ + \$5.-S/H + 6% tax (NJ)

LEVENBACH ASSOCIATES INC.

103 Washington St., Suite 348

Morristown, NJ 07960

Tel: (201) 285-9248

CIRCLE 570 ON READER SERVICE CARD

CATALOG

PC WORLD

Shop The PC World Catalog for fast solutions to your PC needs.

High performance STATISTICAL SYSTEM

STATS+

Limited
time price \$149.

A powerful, elegant, and super-fast statistical package integrated with complete data management and dynamic graphs. Comprehensive selection of descriptive, inferential, and exploratory statistics with forecasting. STATS+ features intelligent, two-way interfaces to data from Lotus, Symphony, dBase, and other programs. **For more info look for our ads in most computer journals, ask your dealer, or contact StatSoft.** Price \$245 (+\$5 ship/handl).



StatSoft

2325 E. 13th St., Tulsa, OK 74104
(918) 583-4149

Overseas offices: **StatSoft of Europe** (Hamburg, FRG), ph.: 040/4200347; **StatSoft UK** (London, UK), ph.: 07072 71166; **Hearne Software** (Melbourne, Australia), ph.: 613-497-4276

CIRCLE 520 ON READER SERVICE CARD

Taxes

1988 TAXES

Calculate 1988 Federal Income Taxes with TAX PLAN.

- 20 Forms & Schedules
- Prints IRS-acceptable forms
- Audits taxes
- Multiple returns
- Saves to disk

IBM/compatibles & Amigas. Only \$34.95. Add \$4 s/h. MA add 5% tax. Check, MO, credit cards.

Quality Business Systems

PO Box 805

Hudson, MA 01749

800/225-5800

Federal & State returns on

single disk—Only \$79.95. Easy to use. Calculates automatically, performs complex "What if" options, prints IRS-approved forms. 25 States available. Requires Lotus 1-2-3 or compatible spreadsheets. VISAMC. \$4 s/h chg. Also available Professional package-\$119., Tax Planner-\$79.95, Corporate-\$149., S-Corporations-\$149.

Park Technologies, Inc.
P.O. Box 1317

Clifton Park, NY 12065

518/877-5881 or 800/423-3189 outside NY

TaxEase
SYSTEM

TAX PREPARATION SOFTWARE

CIRCLE 459 ON READER SERVICE CARD

Surveys

The Survey System

A complete, easy-to-learn package for the entry, editing, processing & presentation of questionnaire data. Produces banner format crosstabs & related tables, statistics (incl. regression) & bar charts. Also codes & reports open-ends. All reports are camera-ready. CRT interview option available.

Creative Research Systems

15 Lone Oak Ctr., Dept. W

Petaluma, CA 94952

707/765-1001

Question Analyzer™

A complete & easy-to-use solution for the inputting, analyzing & reporting requirements of the simplest to most complex questionnaire. A screen image of the actual questionnaire is used for inputting. Data can be logical (yes/no), numerical &/or text. \$95., 60 day Moneyback Guarantee.

Oasis Computer Solutions

6789 Glenview Dr. Suite 215

San Jose, CA 95120

408/997-0164

SURVEY MATE™

The Integrated Survey Package.

- Easy, fast and accurate data entry with automatic values, range, logic checks, age calc, verification, verbatim entry/report for open-ends
- Frequencies
- Recoding
- Crosstabs
- Regression
- ASCII File Export
- Up to 1,000 Fields and 32,000 Cases
- Users in 44 Countries

\$195.00

- 60-day Money-Back Guarantee

David Foster & Associates, Inc.

360 Hayward Ave.

Mount Vernon, NY 10552

(914) 699-9414 for information

(800) 622-4070 for orders

(800) 942-7317 in IL.

CIRCLE 480 ON READER SERVICE CARD

AM-TAX

If you have a PC, this is the way you should be preparing your 1988 income tax return. Fast, easy, & accurate. No spreadsheet software reqd. Thousands of satisfied users.

Regular Version:

Supports 18 schedules and forms (1040, A-SE, 2106, 2119, 2210, 2441, 3903, 4136, 4562, 6251, and 8615).

Prints IRS-approved forms and schedules, plus a graphic 1040 on Epson or IBM-type dot printers. Works with overlays and pin-fed forms. Requires IBM-comp. 256K.

Only \$45

NEW Advanced Version:

All of the regular features plus more forms (1040ES, 3800, 4137, 4255, 4684, 8582), and laser printed 1040 w/graphics on HP-type lasers. Req. 384K and two drives.

Only \$60

State programs for CA, NY, NJ, MD, MO, and VA. Data auto transferred from federal tax forms. \$30 each.

MC/Visa. 30-day guarantee.

AM SOFTWARE

P.O. Box 25010

Kansas City, MO 64119

(816) 241-0014

CIRCLE 481 ON READER SERVICE CARD

Individual Income Tax

If you can move a cursor & enter figures you can use this program. Calculations, transfers are made for you automatically. CPA program w/21 forms \$169, added forms \$5/page. CUSTOM PROGRAMS \$29 + \$5 a page. You pick forms. 5.25/1.2mb or 3.5/720k. PC-up/comp, 123 or Quattro req. Paid call SUPPORT.

APTco

Rt. 2 Owl Creek Rd.

Hiawassee, Georgia 30546

404/896-4342

Terminal Emulation

Micro to Mainframe Made Manageable

Send for information on 4105, 4107, and 4115 TEKTRONIX Terminal emulation software for your PC or PS/2 from the emulation leader—



GRAFPPOINT™

1485 Saratoga Avenue

San Jose, CA 95129

(800) 426-2230/

CA (408) 446-1919

CIRCLE 509 ON READER SERVICE CARD

FOR
LOTUS

StatPackets™

Create Your Own Statistics And Forecasting Package

- Choose from 23 separate routines, \$24.95 each
- Easy to learn and use
- Powerful programs with graphics

Call now for a free brochure
1-800-328-4907



WALONICK ASSOCIATES

The PC Statistics Pros

6500 Nicollet Ave. S., Minneapolis, MN 55423

(612) 866-9022

CIRCLE 451 ON READER SERVICE CARD

New Statmate/Plus

RPOWER, regression power, a superb new version of STATMATE/PLUS, is now available. Hi-res graphics, many regression methods, forecasting, xtabs & other statistics. Interface to dBase, Lotus, Word-Perfect, Paintbrush, etc. Laser support, menus, windows, help, command files & much more. \$295.

Write.

The Software Hill

1857 Apple Tree Lane

Mountain View, CA 94040

415/969-4233

SIR/DBMS Demo \$49.95

THE PROBLEM: Most Statistics Packages are NOT good Database Managers! THE SOLUTION: SIR/DBMS provides the Best Direct Interface to SAS, SPSS, BMDP & SYSTAT. SIR/Schema, DBMS, Forms, SQL+, Help, Host, Graph & Press SOLVE your data management problems, & help prepare your research reports. RESULT: More Time for Data Analysis!

SIR, A Div. of Inter Systems, Inc.

4613 Pinecrest Office Park Dr.

Alexandria, VA 22312

703/642-1600 (VA), 312/480-9270 (IL)

CATALOG

PC WORLD

Shop The PC World Catalog for fast solutions to your PC needs.

Time Management

CONTROL YOUR TIME TO DO LIST MASTER

- ☐ 9 Priorities within 26 Categories
- ☐ Edit Any Field
- ☐ Schedule Due Date/Time per Item
- ☐ Sort on Any Combination of Fields
- ☐ Overdue Item Reminder
- ☐ Completed Items Archived
- ☐ Easy to Learn and Use
- ☐ IBM PC DOS 2.0 or higher

\$25 + \$3 S/H (CA add tax)



SMK-Dept. W,
P.O. Box 2965
Visita, CA 92083
619-758-2580

CIRCLE 528 ON READER SERVICE CARD

Ammunition to conquer your biggest problems!

without V-EMM
(640 kilobytes)



with V-EMM
(32 mega-
bytes)



- The Virtual Expanded Memory Manager provides your EMS applications with up to thirty-two megabytes of LIM EMS 4.0 expanded memory.
- It turns PC/AT or PS/2 extended memory into expanded memory.
- It turns hard disk storage into expanded memory.
- It's compatible with most EMS applications, including 1-2-3.
- Only \$89.95. 30-day money-back guarantee.



V-EMM™

Fort's Software
P.O. Box 1295
Loveland, CO 80539
(303) 663-5629

CIRCLE 551 ON READER SERVICE CARD

AT's DON'T NEED 360KB DRIVES

Allows copying of IBM files for use on IBM PCs, XT's, and compatibles with no hardware or software modifications. A 360K floppy drive is not required. "CPYAT2PC" may reside on your IBM AT hard disk and copies 1 file or entire subdirectories in 1 step. Price \$79. + \$4 s/h

MICROBRIDGE COMPUTERS
INTERNATIONAL, INC.

655 Sky Way - Suite 125
San Carlos, CA 94070
1-800-523-8777
(CA) 415-593-8777
FAX 415-593-7675



CIRCLE 513 ON READER SERVICE CARD

REACH
1.1 MILLION
BUYERS.

ADVERTISE IN
The PC World Catalog.

CALL 800-435-7766
In CA: 800-435-7760

Utilities

Opt-Tech Sort/Merge 4.0

Extremely fast Sort/Merge program. Run as a DOS command or CALL as a subroutine. Unlimited filesizes, most languages, datatypes & filetypes supported including Btrieve & dBASE. Advanced features include record selection, record reformatting & much more! Call or write for more info. MS-DOS \$149, Xenix \$249.

Opt-Tech Data Processing
PO Box 678

Zephyr Cove, NV 89448
702/588-3737

Connect PC's!

COMx™ copies files between any 2 computers incl IBM PS/2. Any size floppy or hard disk. 32 ft universal cable (not 6 ft.), 3.5" & 5.25" disks & manual. VERY easy to use. Uses 4K mem (not 50K+), Multitasking (no slave mode). 115,200 baud. Money back guarantee. Only \$59 (not \$150+). \$3 s/h. A gem.

Biologic

11982 Coverstone Cir./Suite 1622
Manassas, VA 22110
703/368-2949 (fax 703/361-8251)

BREAK 640K!

Why buy expensive boards? VRAM™ gives your PC/XT/AT or PS/2 8 megabytes of memory by turning disk space into expanded memory! Use extended memory for expanded memory. Create VERY LARGE worksheets. FAST. Automatic. Easy to use. 640K not required. Money back guarantee. \$49 + \$3 s/h.

Biologic

11982 Coverstone Cir./Suite 1622
Manassas, VA 22110
703/368-2949 (fax 703/361-8251)

DIRECT ACCESS

Direct Access to All Your Software

- ▲ Organize all your programs on hard disk with user-defined menu system.
- ▲ Access any program or command with a single keystroke.
- ▲ No need to learn complex DOS commands.
- ▲ Usage tracking provides reports on all software usage.
- ▲ Customize passwords for security of any sub-menu or application.
- ▲ Toll-free technical support.
- ▲ A PC Magazine "Editor's Choice" program.

SUGGESTED RETAIL \$89.95 Plus Shipping & Handling
CALL 1-800-242-6368
FOR THE DEALER NEAREST YOU.



1621 WESTGATE ROAD
EAU CLAIRE, WI 54703

CIRCLE 530 ON READER SERVICE CARD

TEXTRA®

stunning page preview, incredible spelling checker, super fast, PC Magazine Editor's Choice!



Ann Arbor Software
345 S. Division
Ann Arbor, MI 48104 • 313/769-9088

Try it for 60 days, FREE!!!

Experience shows, if you try it, you'll like it. Call now, and we'll ship you a copy of Textra (NOT a demo) before you leave work today. Try it for 60 days on your PC. If you like it, buy it (\$74.95). If not, return it at our expense. You can't lose! Try Textra today!

1-800-345-6777

PC-Write 3.0 - NEW!

Fast, full featured. Easy to use, optional menus. Edits large files & multiple columns. With spell check, mailmerge, & more. Supports 500 printers. Software, guide, & tutorial on disk: \$16. Try it, then register & get manual, support, newsletter, & 2 updates: \$89. 90 day guarantee. Visa/MC

Quicksoft, Inc.

219 First Ave. N. #224-PWOC
Seattle, WA 98109
206/282-0452, 800/888-8088

XYMouse

for

XyWrite

XYMouse... the lightning-fast enhancement -- makes XyWrite III Plus even better!

XYMouse... moves the cursor and text quickly and naturally

XYMouse... instantly selects from dozens of commands with easy-to-use mouse windows

XYMouse... accelerates both beginning and advanced XyWriters!

NEW! Support for 'ALaCarte' and networks

CALL NOW for this fantastic timesaver:
GALACTIC SOFTWARE Inc.
2600 Philmont Avenue, Suite 211
Huntingdon Valley, PA 19006
215-947-0930

CIRCLE 494 ON READER SERVICE CARD

Weather

TURN YOUR PC INTO A WEATHER STATION ... IN MINUTES!



Only \$249.00

To order, please call:
1-800-247-5712*

TMI, Inc.

4000 Kruse Way Pl., 2-120, Lake Oswego, OR 97035

*For Info. & In Oregon, call 503-635-3966

Add PC Weather to your IBM PC, XT, AT or compatible and your computer will keep a constant and watchful eye on local weather conditions, while you work on word processing, spreadsheets, or programming. With the new PRO II Expanded Software Option, your computer even performs data-logging. The PCW includes all weather sensors and mounting hardware, plug-in computer card, software, 9V adapter, and complete on-line help screen documentation to change your computer into a personal weather station.

The PCW gives you all this and more!

- Barometer
- Wind Speed
- Speed Alarm
- Wind Gust Record
- Wind Direction
- Wind Chill Factor
- Two Temperatures
- Hi/Lo Temp Alarm
- Hi/Lo Temp Record
- Four Year Calendar
- 12/24 Time & Alarm
- Dly/Yrly Rainfall*

*With the optional RG-2 Rain Collector.

* * MADE IN U.S.A. * *

VISA, M/C, AND AMEX

CIRCLE 523 ON READER SERVICE CARD

PC WORLD
FREE PRODUCT INFORMATION

Circle the number corresponding to the product you need to know more about. Manufacturers will rush product information directly to you.

NAME
COMPANY
ADDRESS
CITY STATE ZIP (required)
TITLE PHONE ()

INFORMATION FROM ADVERTISERS

Table with 32 columns and 32 rows of numbers for advertiser selection.

CATALOG SECTION

Table with 32 columns and 10 rows of numbers for catalog section selection.

PRODUCTS FEATURED IN EDITORIAL

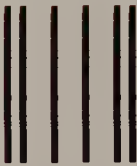
Table with 32 columns and 10 rows of numbers for editorial products selection.

Check this box for your subscription to PC WORLD. You will be billed \$19.97 for a 1-year (12-issue) subscription (U.S. only).

March 1989 Expires 7/12/89 \$1A

FREE PRODUCT INFORMATION

Use these cards for fast, free information. PC WORLD provides this service to help you BUY SMART and USE SMART.



BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO 758 PITTSFIELD, MA

POSTAGE WILL BE PAID BY ADDRESSEE



Free Product Information
P.O. Box 5330
Pittsfield, MA 01203-9871

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO 758 PITTSFIELD, MA

POSTAGE WILL BE PAID BY ADDRESSEE

PC WORLD

Free Product Information
P.O. Box 5330
Pittsfield, MA 01203-9871



FREE PRODUCT INFORMATION

Use these cards for fast, free information.
PC WORLD provides this service to help you
BUY SMART and USE SMART.

PC WORLD
FREE PRODUCT INFORMATION

Circle the number corresponding to the product you need to know more about. Manufacturers will rush product information directly to you.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP (required) _____

TITLE _____ PHONE () _____

INFORMATION FROM ADVERTISERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320
321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340
341	342	343	344	345	346	347	348	349	350										

CATALOG SECTION

451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470
471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490
491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510
511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530
531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550
551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570
571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590
591	592	593	594	595	596	597	598	599	600										

PRODUCTS FEATURED IN EDITORIAL

601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620
621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640
641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660
661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680
681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720
721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740
741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760
761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780
781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800
801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820
821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840
841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860
861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880
881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900

☐ Check this box for your subscription to PC WORLD.
You will be billed \$19.97 for a 1-year (12-issue)
subscription (U.S. only).

Advertiser Index A to Z

Get more information—circle the appropriate number on the reader service card.

- Reader Service Number**
- 3 Acer Technologies, Inc., page 45
 - 15 Allan Technology, page 30
 - 14 Amdek, page 216
 - 12 American Semiconductor, page 275
 - 306 American Small Business Systems, page 47
 - Anthro Corp., page 38
 - Arlington Computer Products, pages 262-263
 - 19 Ashton-Tate, pages 83, 85, 87
 - AT & T Technologies, page 129
 - 302 ATI Technologies, Inc., page 131
 - 29 Bedford Software, page 37
 - 30 Biological Engineering, Inc., page 46
 - 87 Borland, Int'l., page 29
 - 24 Bulldog Computer Products, pages 266-267
 - 17 Caere Corp., page 145
 - 155 Central Point Software, Inc., page 201
 - Channel Mark OUTSERT
 - 262 Chipsoft, Inc., page 52
 - 44 Complete PC, The, page 48
 - 72 Compu\$ave, page 270
 - 40 Compuserve, page 135
 - 213 Computer Direct, Inc., pages 268-269
 - 200 Computer Discount Warehouse, page 254
 - 211 Corel Systems Corp., page 181
 - 48 Corel Systems Corp., page 137
 - 308 Curtis Manufacturing Co., Inc. page C6
 - DAC Software, Inc., page 163

- Reader Service Number**
- 55 Data Access Corp., page 198
 - 74 Dell Computer Corp., pages C2, 3, 4, P1
 - 176 Delta Technology, Int'l., page 22
 - 304 Digifonts, page 50
 - 266 Digital Research, Inc., page 151
 - 60 Diskette Connection, page 270
 - Dow Jones News/Retrieval, page 215
 - 111 Eltech Research, Inc., page 15
 - Epson, pages 120-121
 - 244 Everex Systems, Inc., pages 8-9
 - 240 Fast Micro, page 252
 - 345 Formworx, page 187
 - 227 Gateway 2000, page 253
 - 184 General Electric Computer Leasing, page 133
 - 80 General Parametrics Corp., page 147
 - 122 Great Western Electronics, page 270
 - 313 Hard Drives, Int'l., page 272
 - 35 Hauppauge, page 39
 - 79 Haventree Software, Ltd., page 44
 - 343 Hayes Microcomputer, page 67
 - 83 Hercules, pages 193, 195
 - Intuit, Inc., page 209
 - 41 Kenosha Computer Center, page 255
 - 98 Kensington Microware, Ltd., page C5
 - Lotus Development Corp., pages 24-25, 76-77, 153
 - 270 Lyco Computers, pages 257-260
 - 112 Mannesmann Tally, page 203
 - 239 Meca Ventures, Inc., page 91
 - 217 Merritt Computer Products, Inc., page 196
 - MICROBEST, page 256
 - Micrografx, page 20
 - Microsoft, pages 23, 65
 - 65 Montgomery Grant, page 261
 - 63 Natural Microsystems Corp., page 34
 - 312 NEC Home Electronics, pages 16-17
 - 171 NEC Home Electronics, pages 18-19

- Reader Service Number**
- NEC Home Electronics, pages 53-60
 - NEC Information Systems, page 81
 - 9 Newport Systems, page 192
 - 222 Norton Lambert, page 42
 - NSTL, pages 245, 246-247
 - 130 Parson's Technology, page 265
 - PC Connection, pages 138-143
 - 350 PC Designs, page 89
 - 135 PC Network, pages 249, 250-251
 - 144 Peachtree Software, page 157
 - 168 Quadram, page 33
 - Quarterdeck Office Systems, page 185
 - 282 Reference Software, page 159
 - 226 Right Soft, page 93
 - 125 RP Systems, page 273
 - 280 707 Computer Wholesaler, page 274
 - Scitor, page 32
 - 31 Secure-It, page 196
 - 223 SF Micro, Inc., page 264
 - 66 Softdisk, Inc., page 13
 - 236 SoftKlone Distributing Corp., page 191
 - 18 Softlogic Solutions, page 119
 - Software Publishing, pages 40-41, 70-71
 - 108 Symantec, page 5
 - 295 Tandy/Radio Shack, page 161
 - 212 Tandy/Radio Shack, page 179
 - 178 Telemart, page 188
 - Texas Instruments, pages 51, 183
 - 151 Timeworks, Inc., page 10
 - 251 TLB, Inc., page 63
 - TOPS, page 7
 - 207 Tussey Computer Products, page 194
 - 315 Verbatim, page 155
 - 277 Video Seven, page 26
 - 216 Wells American, page 31

Advertiser Index by Product Category

Get more information—circle the appropriate number on the reader service card.

Reader Service Number

HARDWARE

Boards/Cards/Chips

- 302 ATI Technologies, Inc., page 131
- 44 Complete PC, The, page 48
- 35 Hauppauge, page 39
- 83 Hercules, pages 193, 195
- 277 Video Seven, page 26

Communications

- 343 Hayes Microcomputer, page 67
- 63 Natural Microsystems Corp., page 34
- 168 Quadram, page 33

Computers

- 14 Amdek, page 216
- 74 Dell Computer Corp., pages C2,3,4,P1
- 111 Eltech Research, Inc., page 15
- 244 Everex Systems, Inc., pages 8-9
- 184 General Electric Computer Leasing, page 133
- NEC Home Electronics, pages 53-60
- 350 PC Designs, page 89
- 223 SF Micro, Inc., page 264
- 212 Tandy/Radio Shack, page 179
- 207 Tussey Computer Products, page 194
- 216 Wells American, page 31

Hardware Desktop Publishing

- 80 General Parametrics Corp., page 147

Input Devices

- 17 Caere Corp., page 145
- Microsoft, page 65

**Reader
Service
Number**

Monitors/Displays

- 312 NEC Home Electronics,
pages 16-17
- 171 NEC Home Electronics,
pages 18-19

Printers/Plotters, etc.

- 3 Acer Technologies, Inc.,
page 45
- Epson,
pages 120-121
- 112 Mannesmann Tally,
page 203
- NEC Information Systems,
page 81
- Texas Instruments,
pages 51, 183

Storage Devices

- 30 Biological Engineering, Inc.,
page 46
- 48 Corel Systems Corp.,
page 137

SOFTWARE

Accounting/Financial

- 29 Bedford Software,
page 37
- 262 Chipsoft, Inc.,
page 52
- Intuit, Inc.,
page 209
- 239 Meca Ventures, Inc.,
page 91
- 130 Parson's Technology,
page 265
- 144 Peachtree Software,
page 157
- 251 TLB, Inc.,
page 63

CAD/CAM

- 306 American Small Business
Systems,
page 47

Communications

- 222 Norton Lambert,
page 42
- 236 SoftKlone Distributing Corp.,
page 191
- 295 Tandy/Radio Shack,
page 161

Database Management

- 19 Ashton-Tate,
pages 83, 85, 87C6
- 87 Borland, Int'l.,
page 29
- 55 Data Access Corp.,
page 198
- Lotus Development Corp.,
pages 24-25

- 108 Symantec,
page 5

Desktop Publishing

- 211 Corel Systems Corp.,
page 181
- 304 Digifonts,
page 50
- 266 Digital Research, Inc.,
page 151

**Reader
Service
Number**

- 345 Formworx,
page 187

Educational

- 66 Softdisk, Inc.,
page 13

Entertainment

- 66 Softdisk, Inc.,
page 13

Graphics

- Lotus Development Corp.,
pages 76-77
- Micrografx,
page 20
- Software Publishing,
pages 70-71

Integrated Software

- Lotus Development Corp.,
page 153

Language

- Microsoft,
page 23

LAN

- TOPS,
page 7

Other

- 15 Allan Technology,
page 30
- 79 Haventree Software, Ltd.,
page 44
- Lotus Development Corp.,
pages 24-25
- 9 Newport Systems,
page 192
- Quarterdeck Office Systems,
page 185

Project Management

- Scitor,
page 32

**Spreadsheets/Templates/
Forms**

- DAC Software, Inc.,
page 163

- 345 Formworx,
page 187

- Lotus Development Corp.,
page 153

Utilities

- 155 Central Point Software, Inc.,
page 201
- 176 Delta Technology, Int'l.,
page 22
- 226 Right Soft,
page 93
- 18 Softlogic Solutions,
page 119

Word Processing/Aids

- 282 Reference Software,
page 159
- Software Publishing,
pages 40-41

- 151 Timeworks, Inc.,
page 10

MISCELLANEOUS

Computer Accessories

- Anthro Corp.,
page 38
- 308 Curtis Manufacturing Co., Inc.,
page C6

**Reader
Service
Number**

- 98 Kensington Microware, Ltd.,
page C5

- 217 Merritt Computer Products,
Inc.,
page 196

Mail Order

- 12 American Semiconductor,
page 275
- Arlington Computer Products,
pages 262-263
- 24 Bulldog Computer Products,
pages 266-267
- 72 Compu\$ave,
page 270
- 213 Computer Direct, Inc.,
pages 268-269
- 200 Computer Discount Warehouse,
page 254
- 240 Fast Micro,
page 252
- 227 Gateway 2000,
page 253
- 122 Great Western Electronics,
page 270
- 313 Hard Drives, Int'l.,
page 272

- 41 Kenosha Computer Center,
page 255

- 270 Lyco Computers,
pages 257-260

- MICROBEST,
page 256

- 65 Montgomery Grant,
page 261

- PC Connection,
pages 138-143

- 135 PC Network,
pages 249, 250-125

- 125 RP Systems,
page 273

- 280 707 Computer Wholesaler,
page 274

- 178 Telemart,
page 188

- 207 Tussey Computer Products,
page 194

On Line Services

- 40 Compuserve,
page 135
- Dow Jones News/Retrieval,
page 215

Other

- AT & T Technologies,
page 129
- NSTL,
pages 245, 246-247

Security

- 31 Secure-It,
page 196

Supplies

- 60 Diskette Connection,
page 270
- 315 Verbatim,
page 155

**ADVERTISING
SALES &
MARKETING
REPRESENTATIVES**

Mark Glasner

Director of Advertising Sales
(415/978-3178)

Northwest

Sharon Van Leuven
(*Senior Account Mgr.*)
(415/243-0500)

Northern California

(*San Francisco*)
Natalie Wood (415/243-0500)

Northern California (San Jose)

Virginia Pohlman (*Account
Mgr.*) (415/243-0500)

Southern California

(*Los Angeles*)
Ron Evangelista (*Account Mgr.*)
(213/312-8008)

Southern California (San

*Diego/Southwest/Orange
County*)

Fran Cowen (*Account Mgr.*)
(714/851-4625)

Harvey Diamond

(214/233-3492),

Jeff Edman

(*Eastern Advertising Mgr.*)
(201/967-1350)

New England (Boston)

Bob Ostrow (*Senior Account
Mgr.*) (508/879-0700)

Midwest (N. Chicago)

Robert Diftler (*Senior Account
Mgr.*) (312/827-4477)

Mid-Atlantic/Manhattan

Carolyn Casey (201/967-1350)

Southeast (Atlanta)

Judy Sutter (*Senior Account
Mgr.*) (404/394-0758)

Colette Cornish

(*Advertising Coordinator*)
(415/978-3259)

PC World Catalog

Sharon Van Leuven (*Catalog
Advertising Mgr.*)

Eric Cressy, Deborah Tarantino
(800/435-7760 in Calif.;
800/435-7766 outside Calif.)

IDG Communications

*International Marketing
Services* (617/879-0700,
415/978-3176)

**Independent Advertising
Representatives**

United Kingdom

Beere Hobson & Associates,
Kenilworth, Warwickshire
(011/44 1 926 512424),
London (011/44 1 278 0022)

Taiwan ACE MEDIA Agency
Co., Ltd., Taipei (011/866 2 721
4302)

Japan IDG Communications/
Japan, Tokyo (011/ 81 3 403 8515)

France IDG Communications/
France, Neuilly-sur-Seine
(011/33 1 47 47 12 72)

Germany CW Publikationen,
8000 Munich 40, West Germany
(011 49 89 3 60 860)

Products Featured in Editorial

*Get more information—
circle the appropriate
number on the reader
service card.*

Reader
Service
Number

Accounting

- 750** 4-in-1 Basic Accounting 1.0,
RealWorld,
page 113
- 751** The Accounting Partner 3 3.0P,
Star Software Systems,
page 111
- 752** Accpac Easy Accounting 1.0A,
Computer Associates,
page 116
- 753** Bedford Integrated Accounting
3.23D,
Bedford Software,
page 109
- 754** BusinessWorks PC 6.1,
Manzanita Software Systems,
page 112
- 671** Complete Statistical System 2.1,
Statsoft,
page 92
- 755** DacEasy Accounting 3.0,
Dac Software,
page 112
- 610** Diamond Video Management
System,
Information Management
Consultants,
page 164
- 611** FT-40,
TEC America,
page 164
- 612** The General Store,
Crichlow Data Sciences,
page 164
- 613** KeyRetailer,
SoftKey Software Products,
page 164
- 756** One-Write Plus 2,
Great American Software,
page 110
- 757** Peachtree Complete II 4.21,
Peachtree Software,
page 116
- 614** Quick Register,
Chuck Atkinson Programs,
page 164
- 657** Venture,
Star Software Systems,
page 86

Reader
Service
Number

- 615** Xtrasoft,
Xtrasoft,
page 164

Add-On Board

- 723** 286 Accelerator Board,
ATD,
page 168
- 734** 286 Express-12,
PC Technologies,
page 168
- 734** 286 Express-16,
PC Technologies,
page 168
- 734** 286 Express-8,
PC Technologies,
page 168
- 734** 286 Express/30-12,
PC Technologies,
page 168
- 734** 286 Express/30-16,
PC Technologies,
page 168
- 734** 286 RAMracer,
PC Technologies,
page 168
- 731** 286 Speed Card,
Ocean Interface,
page 168
- 737** 286i 10,
Sota Technology,
page 168
- 737** 286i 12.5,
Sota Technology,
page 168
- 720** 386 HummingBoard 16,
A.I. Architects,
page 168
- 720** 386 HummingBoard 20,
A.I. Architects,
page 168
- 720** 386 HummingBoard 25,
A.I. Architects,
page 168
- 733** Breakthru 286-12,
PCSG,
page 168
- 733** Breakthru 286-8,
PCSG,
page 168
- 653** The Complete Communicator,
The Complete PC,
page 82
- 724** EverTurbo/12,
Everex Systems,
page 168
- 727** Fast 88, FA-100,
Microspeed,
page 168
- 727** Fast 88, FA-120,
Microspeed,
page 168
- 728** FastCache-286 9,
Microway,
page 168
- 728** FastCache-286 12,
Microway,
page 168
- 722** Hot Shot/286,
AST Research,
page 168
- 725** Inboard 386/PC,
Intel,
page 168
- 658** Instant Image 5500,
Consolink,
page 86
- 726** Mach 20,
Microsoft,
page 168

Reader
Service
Number

- 730** Mountain Racecard 286,
Mountain Computer,
page 168
- 603** Network Card Plus Total
Network Solution,
Hercules Computer Technology,
page 122
- 728** Number Smasher/ECM 10,
Microway,
page 168
- 728** Number Smasher/ECM 12,
Microway,
page 168
- 652** OmniPage,
Caere,
page 80
- 736** PC286-10,
Seattle Telecom & Data,
page 168
- 736** PC286-12.5,
Seattle Telecom & Data,
page 168
- 732** PCTurbo 286e-10,
Orchid Technology,
page 168
- 721** PC-Elevator 386,
Applied Reasoning,
page 168
- 735** Quad 386XT-16,
Quadram,
page 168
- 735** Quad 386XT-20,
Quadram,
page 168
- 602** RYBS Hicard,
RYBS Electronics,
page 122
- 736** STD3270PC,
Seattle Telecom & Data,
page 168
- 728** SuperCache-286,
Microway,
page 168
- 732** TinyTurbo 286,
Orchid Technology,
page 168
- 666** Token-Ring Network 16/4
Adapter,
IBM,
page 90
- 666** Token-Ring Network 16/4
Adapter/A,
IBM,
page 90
- 729** TurboCache 286,
Mini Micro Supply,
page 168
- 732** TwinTurbo 12,
Orchid Technology,
page 168

Communications

- 667** Crosstalk Mk.4 1.1,
Digital Communications Assoc.,
page 90
- 667** Crosstalk XVI 3.7,
Digital Communications Assoc.,
page 90
- 668** Mirror III,
SoftKlone,
page 90
- 660** NetWare 3270 LAN
Workstation,
Novell,
page 88
- 660** NetWare SNA Gateway,
Novell,
page 88

Reader
Service
Number

- 625** Relay Gold 3.0,
Relay Communications,
page 160
- 666** Token-Ring Network Bridge
Program 2.1,
IBM,
page 90

Computer System

- 691** Arche Pro-File 286,
Arche Technologies,
page 130
- 690** IBM PS/2 Model 30 286,
IBM,
page 126

Data Base

- 630** Clarion Personal Developer,
Clarion Software,
page 213
- 631** Clarion Professional Developer,
Clarion Software,
page 213
- 680** Dataflex 2.3b,
Data Access,
page 105
- 740** dBASE IV 1.0,
Ashton-Tate,
page 94
- 681** Informix-SQL 2.10,
Informix Software,
page 106
- 659** NetWare SQL,
Novell,
page 88
- 682** Paradox for OS/2,
Borland Int'l,
page 103
- 683** R:base for OS/2,
Microrim,
page 104

Development Tool

- 632** Logic Gem,
Sterling Castle,
page 213
- 633** Menu Blocks 2.0,
Bridgeway Publishing,
page 213
- 635** Optdebug,
SLR Systems,
page 213
- 636** Optlink,
SLR Systems,
page 213
- 637** PDQHelp,
Leverage Software,
page 213
- 638** PDQPlus,
Leverage Software,
page 213

Disk Drive

- 651** LANStor LAN650E,
Storage Dimensions,
page 79
- 640** Plato Hardpac 20,
Sunrise Technology,
page 199
- 695** Plus Passport,
Plus Development,
page 146
- 651** SpeedStor AT650E,
Storage Dimensions,
page 79

Display

- 655** LM-317,
Princeton Graphics Systems,
page 84

Q.

“Where Do I Turn For
More Information?”

A.

- 1.** Turn to the Reader Service Card at the back of this issue of *PC World*.
- 2.** Find the Reader Service number of the product you want in the product or advertiser indexes.
- 3.** Circle the number, fill out the postage-paid card and send it in. It's that simple.

In return, our advertisers will send you more information on the products you want. It's just another way that *PC World* helps you make the best buying decisions for your company.

PC WORLD

Reader Service Number

- 655** Ultra 16,
Princeton Graphics Systems,
page 84

Font

- 641** 25 Cartridges in One!,
Pacific Data Products,
page 202

Form Generation

- 656** Per:Form,
Delrina Technology,
page 84

Graphics

- 621** Graph-in-the-Box 2.2,
New England Software,
page 148
- 620** PFS: First Graphics 1.0,
Software Publishing,
page 148

Information Service

- 624** Prodigy,
Prodigy Services,
page 156

Language

- 634** Optasm,
SLR Systems,
page 213
- 622** Turbo Pascal 5.0,
Borland Int'l,
page 150

LAN Package

- 650** PC LightCard,
SunRiver,
page 79
- 601** TOPS,
Sun Microsystems,
page 122

Modem

- 693** Intel 2400B,
Intel,
page 136
- 694** MT224ES,
Multi-Tech Systems,
page 136

Printer

- 692** Hewlett-Packard LaserJet IID,
Hewlett-Packard,
page 132

Security

- 700** Lockette,
Z-Lock Manufacturing,
page 208

Scanner

- 654** SB-A4301 Image Scanner,
Pentax Technologies,
page 82

Utility

- 661** @WSLink,
Goldata Computer Services,
page 88
- 669** Disk Technician Advanced,
Prime Solutions,
page 92
- 662** Look & Link,
Personics,
page 88
- 710** Magellan,
Lotus Development,
page 72
- 760** SideKick for Presentation
Manager,
Borland Int'l,
page 74
- 623** Trading Post 1.0,
LaserTools,
page 154

NEW FROM NSTL
(National Software Testing Laboratories)
--the official research facility of
PC WORLD

How to Structure the Ideal MULTIUSER ACCOUNTING ENVIRONMENT.

An outstanding new tool helps simplify the transition.

The trend is clear. Today, business after business is upgrading from *single-user* to *multiuser* accounting systems.

To maximize productivity and avoid costly delays, *several* departments and individuals need to share the same resources. This includes simultaneous access to critical financial data and the ability to run multiple functions concurrently.

The multiuser environment has become *essential*! Indeed, the sight of a lone bookkeeper tied to one terminal may soon be as archaic as the clerk with an eyeshade and quill pen hunched over a dusty ledger.

But the *right* product choices must be made—and *all* the elements must function together efficiently. *Three key elements are required*: a multiuser accounting software package, a compatible network operating system, and a powerful processor.

NSTL's *Selection Guide to the Multiuser Accounting Environment* can help you make the best decisions.

STAGE 1: The right software.

In a multiuser environment, *network functioning* and *security features* are paramount. But *not* all programs take full advantage of the shared file capabilities of LANs. And security controls may be absent or deficient.

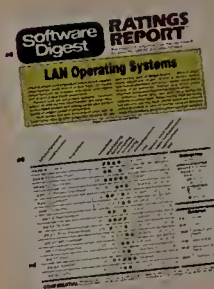
NSTL's *Selection Guide to the Multiuser Accounting Environment* gives you comparative ratings of the leading programs, including *AccPac Plus*, *Macola*, *Platinum*, *RealWorld*, *SBT Accounting Library*, *Solomon III* and others.

We tested each program for:

- ✓ **Audit Trail Performance.**
How strong is the integrity of the audit trail? Can you easily verify the numbers on financial statements? Will you waste time tracing business transactions? Can you find backup documentation?
- ✓ **Versatility and Report Generation.**
Are the program's features and capabilities sufficient to handle *all* your company's needs? Are there upgrade options so it can adapt as your organization grows? What reporting formats (predefined and customized) does the program permit?

- ✓ **Usability.**
How easy is the program to learn and use? To enter transactions and produce reports? How good is the user interface? What about menu navigation, help features, manuals, tutorials, other training aids?
- ✓ **Data Integrity and Security.**
How good are the controls for error handling and system failure? Are there automatic validity checks? How well does the program ensure against unauthorized access? Does it permit individual file and record locking?

STAGE 2: The right network operating system.



LANs are so complex that they challenge even experts.

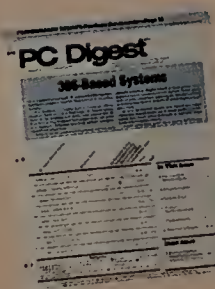
How many users will the network support? How quickly can transactions be processed? What topologies and network adapters are supported?

Some multiuser accounting programs will *not* work efficiently on certain networks. What's more, installation and maintenance can prove difficult and frustrating.

We've cut through the confusion and simplified the decision—with detailed tests and comparative ratings of the network operating systems of *IBM*, *Novell*, *3Com* and others.

The *Guide* supplies the results of our exhaustive LAN functionality tests for data protection, administrator utilities, file servers, printer operations and much more.

STAGE 3: The right processor.



To optimize the performance of multiuser accounting software, you need a powerful processor as your file server. A *386-based* file server is ideal.

NSTL has run comprehensive tests on the latest 386 models manufactured by *ALR*, *Compaq*, *Everex*, *IBM* and others.

Our data will help you select the right file server—one powerful enough to fully

support your new multiuser accounting system.

Solid recommendations simplify a challenging task.

On the basis of its tests, NSTL has reached firm conclusions on which components are *best*—and *why*.

Our superb graphics and "star" rating system let you see *at a glance* which products are right for your organization's needs. All specifications and prices are included.

So you won't have to guess. You'll *know* which system is best. You'll have the hard data you need to make a sound, defensible decision. And you'll *avoid* mistakes that can cause big trouble.

NSTL's *Selection Guide to the Multiuser Accounting Environment* consists of three current, detailed reports in a handsome, durable three-ring binder. The price is just \$95. Your satisfaction is guaranteed.

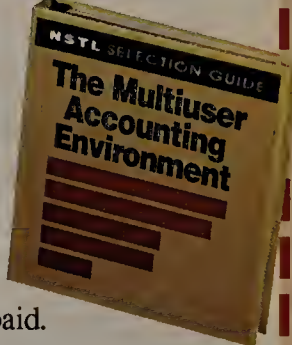
Remember: for the multiuser accounting environment to work, *every* element must be right. The stakes are high. A small investment you make today can protect a much larger one. Order this valuable guide now.

For fastest service, CALL TOLL-FREE:
1-800-223-7093

NSTL

National Software Testing Laboratories,
Plymouth Corporate Center, Box 1000,
Plymouth Meeting, PA 19462

☐ **YES** — send us NSTL's *Selection Guide to the Multiuser Accounting Environment* for \$95, plus shipping and handling. If we're dissatisfied for any reason, we may return it without being charged, or receive a full refund if prepaid.



☐ \$95 enclosed. (I save shipping & handling)
☐ Bill us
Charge to: ☐ MasterCard ☐ Visa ☐ AmEx.

Acct. # _____
Exp. _____
Sig. **X** _____
PLEASE PRINT

Name _____

Title/Dept. _____

Company _____

Address _____
No P.O. box numbers, please.

City _____ State _____

Zip _____ Phone (____) _____
(in case we have a question about your order)

Where does PC WORLD

Answer: to NSTL — America's leading computer

If you need the highest level of comparative data... NSTL's PC Digest is the solution.

Last year, *PC World* designated National Software Testing Laboratories as its official research facility. And for good reason.

NSTL is the leading independent research organization exclusively devoted to testing PC hardware and software. Our knowledge, experience and skilled technical staff enable us to generate analytical data so accurate, comprehensive and meaningful that no one else can match it.

PC Digest is our comparative ratings report on IBM-compatible PCs and peripherals. It's the *authoritative* source for objective, scientific hardware evaluations.

Granted, this unusual publication is not for everyone. But if you need to go *beyond* the ads and the reviews...if you require a *deeper level of analysis*...if your work calls for *complete* and *systematic* data to guide your buying decisions...then *PC Digest* is the only place to turn.

The ultimate hardware reference tool.

Today, the PC marketplace is more crowded and confused than *ever* before.



PC Digest evaluates a wide range of PCs and peripherals.

How can you be *certain* a piece of equipment will prove reliable? That it will do all it claims? That it will be compatible with your existing system? How can you make truly *informed* buying decisions?

There's only one *sure* way to evaluate the hundreds of competitive products. They must be *tested*. Head-to-head. Feature by feature. Against precise, scientific benchmarks. Performing real-world business tasks.

Only *PC Digest* performs this exacting research process. There is no other resource that even comes close.

Every major PC and peripheral is evaluated.

New equipment is a major investment. And, for most organizations, buying PCs and peripherals is a *continuous* process — not a one-time event.



Skilled engineers spend weeks methodically testing each piece of equipment.

PC Digest can help you make the *right* decisions — and *avoid* expensive mistakes. Arriving each month, it's an *ongoing* reference source for a wide range of products. For example:

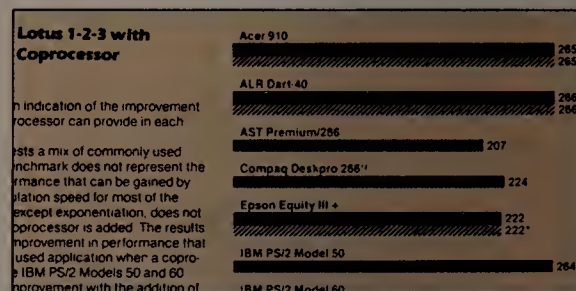
✓IBM and compatible 286 and 386 machines ✓Laptops ✓Modems ✓Laser printers ✓Backup systems ✓VGA boards ✓Monitors ✓Network adapters ✓Memory expansion cards ✓Disk drives ✓Hard disk cards ✓Other mass storage devices ✓Accelerator boards ✓Dot-matrix printers ✓Co-processors ✓Scanners ✓And more

For each product, we determine: How easy is it to set up? What are its features and capabilities? What special system requirements are necessary? How well does it work with major business software? How fast does it perform typical tasks? How good is the documentation? How does it function under DOS and OS/2?

We tell you which products are *best* — and which have *problems*. And we make *specific recommendations* based on the hard data our tests uncover. (Specifications and prices are included.)

Users applaud *PC Digest's* graphic format. Test results are clear, readable and

accessible. Quick-reading charts show how products stack up against each other.



Benchmark test results show how each product scored while running major business software programs.

Couldn't the concrete, research-based data supplied *only* by *PC Digest* help you improve your product selection decisions — and save you time, money and hassles?

Objective, scientific testing standards.

Why is *PC Digest* so widely used — and so highly regarded?

For a start, no one else can equal NSTL's resources. Our laboratory facilities are state-of-the-art. Our staff of skilled engineers and technicians draws upon a wealth of "hands-on" experience that can be gained only by scientifically testing PC products day after day.

PC World announces an innovative partnership.

PC World has entered into an unprecedented arrangement to have our review process conducted by National Software Testing Laboratories.... NSTL has the reputation for undertaking the most comprehensive performance and versatility tests of software and hardware products in our industry....They're going to *tell* it like it is — not *sell* it like it is.

— **David Bunnell**, Chairman

We've recognized the increasing need for performance testing that measures products from a real-world perspective....That's why we have selected National Software Testing Laboratories of Philadelphia, Pa. as the exclusive test facility for all products reviewed in *PC World*.

— **Richard Landry**, Editor

PC World is proud to include benchmarks and evaluations from the industry's leading source of unbiased product information....NSTL has earned a reputation as the Underwriters Laboratories of the PC industry. Renowned for its exacting, objective methodology, [its] solid reputation has been built by a staff as fastidious as a team of wary tax auditors.

— **Eric Knorr**, Senior Associate Editor

go to test equipment?

testing lab.

Performance tests are *applications-based*. We test machines with popular software such as the major spreadsheet and database programs. In contrast, many magazine reviews use misleading "raw processing" benchmarks that bear little relation to real-world business tasks. And the loose-leaf data services, despite their imposing appearance, perform *no* testing at all.

PC Digest is fiercely independent. We have a firm policy of accepting *no ads*. That gives us the freedom to be *fully objective and unbiased* in our product evaluations.

Without vested interests of any kind, we can be *totally* impartial. We're free to print *exactly* what our tests reveal — and we don't pull our punches.

Monthly "Buyer's Alert" keeps you on top.

Selecting equipment is a never-ending process. That's why *PC Digest* monitors the fast-changing PC marketplace on an *ongoing* basis. It keeps you a jump *ahead* of events.

So it's not surprising that *PC Digest* frequently "scoops" the computer industry press. With the *first* comprehensive benchmark tests of IBM's PS/2 line. The *first* tests of the Compaq and IBM 25MHz PCs. And the *first* tests of OS/2's multitasking abilities.

ACCELERATOR BOARD FEATURES	Breaktr 286	Fastcache 286	Inboard 386	Mach 10	PCturbo 286-10	Racecard 286	SpeedPac 286
Speeds up IBM PC-1	Y	Y	N	Y	Y	Y	Y
Speeds up IBM/XT	Y	Y	N	Y	Y	Y	Y
Speeds up IBM/AT	N	N	Y	N	N	N	N
Microprocessor	80286	80286	80386	8086	80286	80286	80286
Memory Cache	16K	8K	64K	8K	N	8K	12K
On-board memory	N	N	OP1	N	1024K	N	N
Computer processor retained	N	Y	N	N	Y	N	N
Change Speed	Y/S	Y/S	Y/S	Y/E	Y/S	Y/I	Y/I
Change speed without rebooting	Y/S	N	Y/S	Y/E	Y/S	N	N
Change speed within application	N	Y/K	Y/K	N	N	N	N
Disk caching included	Y	Y	N	N	Y	N	N
RAM disk included	N	Y	N	N	Y	N	N
Print spooler included	N	Y	N	N	Y	N	N
Localshort card	SH	SH	I	I	I	SH	SH

Which products have the capabilities you want?
Our technicians verify each feature.

Each issue includes *Buyer's Alert*. This useful monthly newsletter previews new products and new models...forecasts technology changes and trends...gives you an inside look at vendor policy changes...and much more.

An important plus: With *PC Digest*, everything you need to know is in *one* place. So you don't have to plow through stacks of material searching for the answers you need.

QMS-PS 810 ★★★★★
PostScript Laser Printers

SPECIFICATIONS
Price
 \$5,495
Date First Shipped
 June 1987
Memory Included
 2MB expandable to 3MB (Extended Memory Option Kit, \$399)
Marking Engine
 Manufacturer: Canon SX
 Life expectancy: 200,000 or 5 years
 PostScript version: 47.0
 Imaging method: Direct positive exposure
 Recommended toner cartridge: Canon (5,000 sheets)
Paper Requirements
 Sizes: Letter, legal, A4, B5, envelopes, labels, film
 Weights: 35# maximum



PRODUCT RATINGS
 (Graphs showing performance metrics)

Each product receives its own detailed report.

New changes and pressures ahead! Will you be ready?

Warning! The personal computing environment is moving *faster*. The pressures will intensify. Will you be prepared?

Technology is proliferating at dizzying speed. Networking is reshaping the way business functions. The 386 systems and OS/2 will create tough new price/performance decisions.

Expect more competing vendor claims and more hype. New compatibility problems. Product shortages and price increases. In sum, more *confusion* than ever before!

The Master Ratings Chart on each issue's front cover provides at-a-glance comparative data on every product.

PERFORMANCE RESULTS: 13 Speed and Power Tests
PC Digesttm
From the publishers of Software Digest
The Independent Comparative Ratings Report for Selecting PC Systems and Peripherals

★★★★	AST Premium/286	15
★★★★	Compaq Deskpro 286	15
★★★★	IBM PS/2 Model 60	16

In This Issue
* Comparisons to...

Today, with DP budgets tighter, with the new emphasis on documenting computer productivity and bottom-line payoff, every purchasing decision will have to be justified. *PC Digest* gives you the hard data you need to *confirm* your decisions, and *defend* them.

Thousands of DP managers, MIS directors, PC coordinators, small business owners and independent consultants subscribe to *PC Digest*. They read it, rely on it, and turn their well-thumbed back issues into an indispensable reference and purchasing tool.

Isn't it time you joined them — and armed yourself with the kind of vital intelligence you won't find *anywhere* else?

Prove it for yourself. Give us the word and we'll begin a no-risk introductory subscription.

For fastest service, CALL TOLL-FREE:

1-800-223-7093

FAX? Complete the coupon below and use our Fax number: (215) 941-9952

☐ **YES**, begin our no-risk trial subscription (12 monthly issues) to *PC Digest*. You'll send the current issue, without obligation, on a 30-day examination basis. If we're dissatisfied, we have the right to cancel within 30 days. The current issue remains ours to keep without charge.

☐ \$185 check enclosed ☐ Bill us
☐ Charge to: ☐ MasterCard ☐ Visa ☐ American Express

Acct. no. _____ Exp. _____

Signature **X** _____

Name _____

Title / Dept. _____

Company _____

Address _____

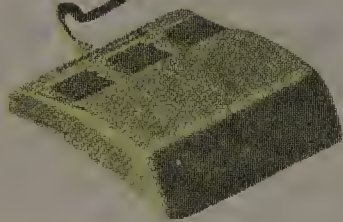
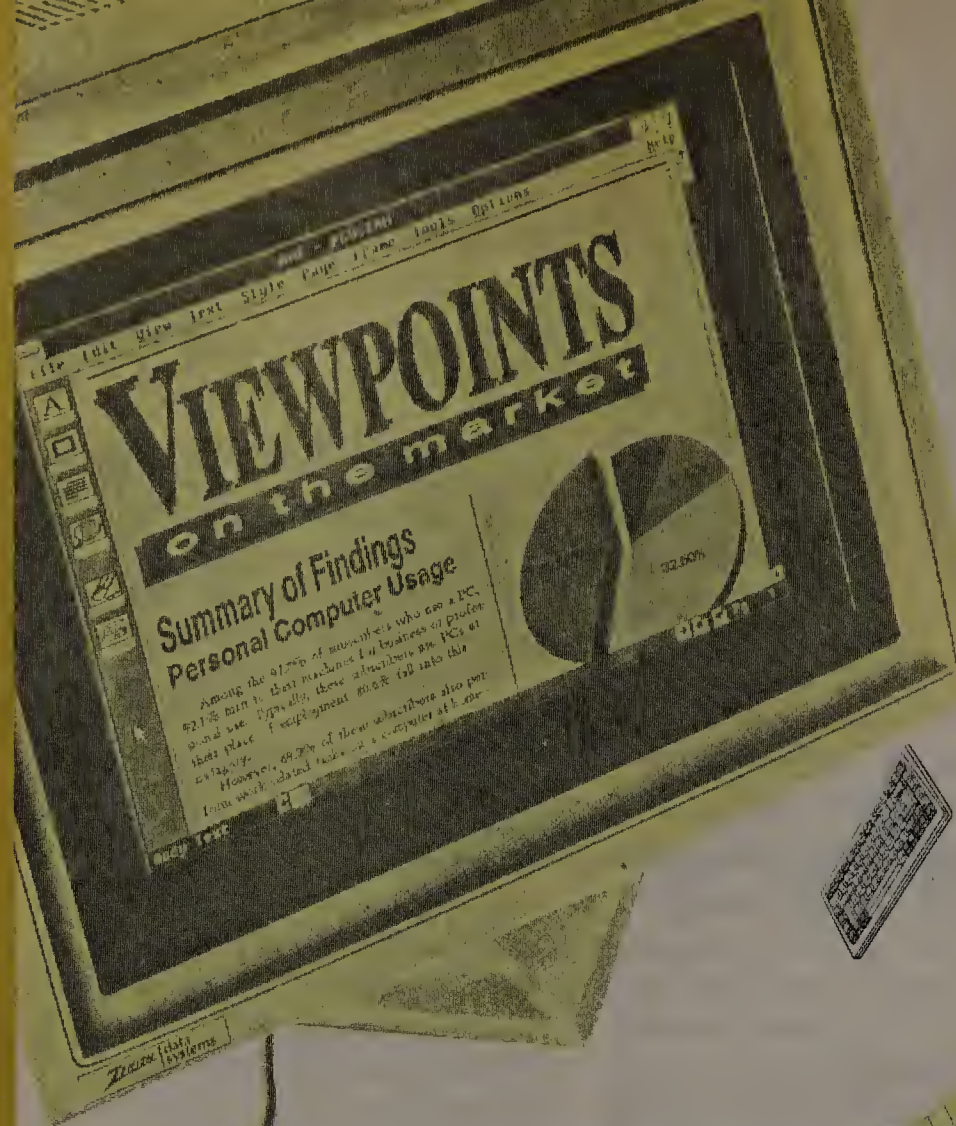
City _____ State _____ Zip _____

Phone (_____) _____

(in case we have a question about your order)

NSTL

NATIONAL SOFTWARE
TESTING LABORATORIES
Box 1000
Plymouth Meeting, PA 19462

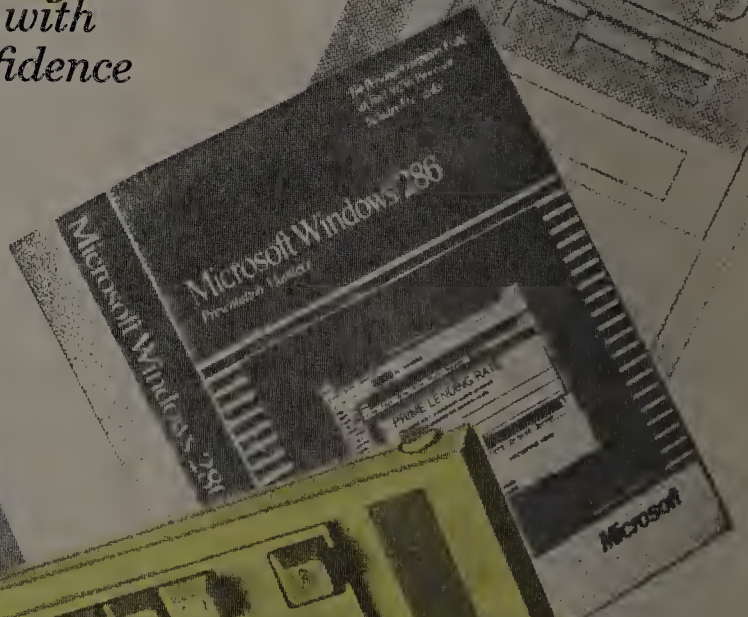
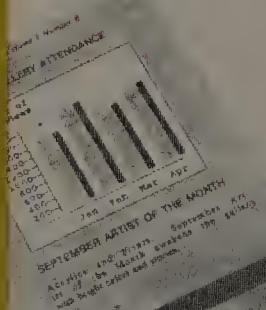


PC WORLD MAIL ORDER Shopping Guide



*Buy with
Convenience*

*Buy with
Confidence*



HEADSTART III. SAVE \$500

*HeadStart III™ delivers speed, power and performance.
PC Network delivers the savings.*

HeadStart III is the first advanced system to come complete with all the features advanced users need and expect - all in one ready to run package! Nothing extra to buy - and no hassles putting it together!

HeadStart III comes complete with all these powerful, advanced features:

- Multi-tasking capability
- OS/2 ready
- Dual format - runs 5.25" and 3.5" diskettes
- 6-In-1 VGA graphics
- 1MB of RAM - expandable to 3MB
- Complete library of business and professional software
- Easy to use HeadStart Advanced Operating Environment
- 3-button Mouse

UNIQUE DUAL FORMAT

With HeadStart III, you don't have to worry about whether you've made the right choice of operating systems. A 1.44MB 3.5" and a 1.2MB 5.25" floppy drive are both built in. Create new files using high capacity 3.5-inch OS/2 diskettes and still run all your current files stored on 5.25-inch DOS diskettes.



On top of all this, HeadStart III is OS/2 ready. It runs the kinds of powerful applications businesses today can't do without.

MULTI-TASKING SPEED AND POWER

Enter data, print out, perform analyses...HeadStart III easily does several things at once. With HeadStart III attached to the host or acting as a file server, your people can each do their job without interrupting yours.

HeadStart III's 80286 CPU and 1MB installed RAM, in tandem with 32MB hard disk drive with an astonishing 1 to 1 interleave, store all your information...and then get it to you the instant you need it.



**PC NETWORK EXCLUSIVE...
ORDER NOW AND SAVE \$500!**

*Buy the complete HeadStart III
System with VGA Color Monitor
and save \$500. Or, lease it for
as low as \$99 a month..*

HEADSTART III SPECIFICATIONS

MICROPROCESSOR:	Intel 80286-1	HARD DRIVE:	32MB, 28 milliseconds, 1:1 Interleave
SPEED:	12MHz/4.77 Switchable	BUILT-IN INTERFACES:	Parallel, 2-RS232 serial, mouse, joystick
BIOS:	Award	EXPANSION SLOTS:	Six 8/15 bit (3 available to user)
BUILT IN RAM:	1MB	MOUSE:	Standard Opto-mechanical
ROM:	32K	POWER SUPPLY:	145 watts 110/220 switchable
EXPANDABLE TO:	3MB		
KEYBOARD:	101 key "PS/2" compatible		
GRAPHICS:	VGA Autosync		
FLOPPY DRIVES:	One 1.2MB 5.25" One 1.44MB 3.5"		

A GRAPHIC IMPROVEMENT

Whether you're an expert in desktop publishing or accounting, HeadStart III's true 16-bit built in VGA graphics will bring out the artist in you. Create your own visuals or display color photos every bit as sharp and brilliant as the original, in up to 256 colors at once from a palette of 256,000!

Build up HeadStart III as you build up your business. Attach modem, printers and other peripherals without ever opening the back. And use the 3 full size "AT" compatible expansion slots for networking, adding a fax card or installing an internal modem.

BRAND NAME PROGRAMS...FREE!

On top of the unique HeadStart Advanced Operating Environment that makes it so easy to master, HeadStart III includes thousands of dollars worth of top-selling applications software FREE.

- Floppy Driver™
- Bookmark Plus™
- Framework II™ by Ashton-Tate
- Perspective Three-D Graphics™
- Twist & Shout™
- Publish-it™
- Splash!™
- XTree™
- Computer-Ease™
- ATI™ Skill Builder
- Chessmaster™ 2000

SUPPORT YOU CAN COUNT ON

1-800-PC-COACH

When you need assistance or have technical questions about your hardware or software, simply call 1-800-PC-COACH - The nationwide hot-line available only to registered HeadStart III owners.

18 MONTH ON-SITE SERVICE

HeadStart III is backed by a full 18-month Limited Warranty on parts and labor. Should service be required, a trained technician from the nationwide Harris consumer network will be sent to your location at no charge during the warranty period.

LEASE AS LOW AS \$99/MONTH

PC Network can custom design a leasing program to fit your business needs. It gives you 100% financing to free your working capital or credit lines, and lets you enjoy substantial tax advantages.

PC NETWORK IS A MEMBER OF THE

MMC
MICROCOMPUTER
MARKETING COUNCIL
of the Direct Marketing Association, Inc.

MAJOR CREDIT CARDS ACCEPTED

HRS.: MON. - FRI.: 8:30 AM - 6:00 PM
SAT.: 10:00 AM - 4:00 PM

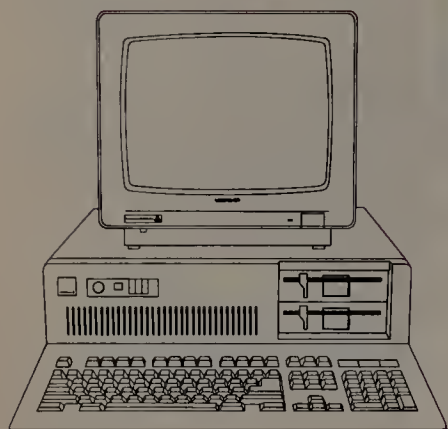
PW0389

PC NETWORK **1-800-621-SAVE** 625 ACADEMY DRIVE
NORTHBROOK, IL 60062

PC NETWORK. SERVICE



THE™ PC+ TURBO XT/10 SYSTEM



\$599

- Intel 8088-1 Switchable from 4.77 to 10MHZ • 512K RAM Expandable to 640K
- Dual Floppy Controller • 150 Watt Power Supply • Mono/Color Video Graphics Board • 12" Monochrome Monitor • 1 Serial/1 Parallel/1 Game Ports & Clock • 101 "AT" Style Key Keyboard • FREE 1 Year Warranty.

Color Systems With Mitsubishi Monitors

CGA Color System \$869.
EGA Color System \$1079.
CGA w/20MB \$1137.
EGA w/20MB \$1347.

THE™ COMPLETE 40MB 286/12 PROFESSIONAL SYSTEM

\$1579

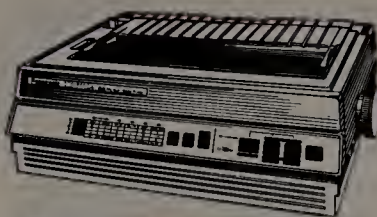
- 12MHz Switchable Speed • 512K RAM Expandable to 1024K • 1.2MB Mitsubishi Disk Drive • FDC/HDC Dual Controller • 40MB Seagate (ST251-1) Hard Drive • 1 Serial/1 Parallel/ & Game Port • Color/ Mono Graphics Card • 101 "AT" Key Keyboard • 200 Watt Power Supply • 12" Monochrome Monitor • FREE 1 Year Warranty

Color Systems With Mitsubishi Monitors

CGA Color System \$1779.
EGA Color System \$2099.
VGA Color System \$2229.



PRINTERS



**PANASONIC KXP-1124
Dot Matrix
Printer \$399.**

PANASONIC

1180i CALL.
1124 192/63 cps 339.
1524 240/80 cps 575.
1592 220/38cps 415.
1595 290/51cps 449.
KXP 4450 Laser w/Toner 1599.

EPSON

LX 800 180/32cps \$199.
EX 800 300/60cps 439.
FX 850 264/54cps 359.
FX 1050 200/54cps 467.
LQ 500 180/60cps 328.
LQ 850 264/88cps CALL.
LQ 1050 264/88cps CALL.
LQ 2550 400/133cps 949.
DFX 5000 533/80cps CALL.

NEC

P2200 170/55cps \$369.
P5200 265/90 cps 530.
P5300 265/70 Wide 719.
P9XL 400/330 cps 1092.
LC890 Laser 3199.

OKIDATA

ML 182P 180/30 \$239.
ML 320 300/63 345.
ML 321 300/63 479.
ML 390 270/90 479.
ML 391 270/90 655.
ML 393 450/120 1005.
ML 393 COLOR 1079.

HEWLETT PACKARD

Deskjet \$709
Laser Jet II 1717.

DICONIX

150p 150/50 \$313.
300 WP 310/73 489.



MONITORS

MAGNAVOX

Amber TTL Mono \$75.
14" VGA Mono/Flat (640x350) 169.
14" RGB Analog (640x240) 254.
14" EGA/CGA (720x350) 340.
14" VGA (800x600) 415

MITSUBISHI

1409 13" CGA (640x200) \$249.
1410 13" EGA (640x350) 361.
1430 13" EGA(640x350) 399.
Diamond Scan (800x600) 490.

SONY

1302 13" Multiscan (1024x768) .. \$644.
1303 13" Multiscan (800x600) 522

PRINCETON GRAPHICS

Ultrasync 12" \$519.
Ultrasync 16" 879.

ZENITH

1390 13" RGB (640x480) \$439.
1490 14" FTM Monitor 648.

NEC

Multisync II 13" (800x600) \$599.
Multisync Plus 15" (960x720) 919.
Multisync XL 19" (1024x768) 2249.

VIDEO BOARDS

THE™ Mono/Color \$59.
THE™ EGA /480 159.
THE™ VGA/256 220.
PARADISE Autoswitch 480 215.
PARADISE VGA+ 274.
VIDEO 7 VEGA VGA 285.
VIDEO 7 VEGA DELUXE 214.
ORCHID Pro Designer VGA 299.
ORCHID Designer VGA 800 235.
ATI EGA Wonder 800 230.

COMPUTER SYSTEMS

AST Premium 386 MDL. 300 \$2770.
AST Premium 286 MDL. 140 2648.
COMPAQ Deskpro 286-/40MB .. CALL.
COMPAQ Deskpro386-25/110 .. CALL.
COMPAQ Deskpro 386-20/60MB CALL.
IBM MDL. 30-21, 20MB CALL.
IBM MDL. 30-286, 30MB CALL.
IBM MDL. 50Z,30/MB CALL.
VENDEX HEADSTART III CALL.

LAPTOPS

**NEW!
TOSHIBA
T-3100E
\$2799.**



TOSHIBA

T-1000 \$779.
T-1200H/HB 2214/2399.
T-1600 NEW! CALL.
T-3100E NEW! 2799.
T-3200 3599.
T-5100 4749.
T-5200 NEW! CALL.

**NEW!
ZENITH
Supersport
In Stock Now!**



ZENITH

Supersport MDL. 2 CALL.
Supersport MDL. 20 CALL.
Supersport 286 MDL. 20 CALL.

NEC

Ultralite CALL.
Multi Speed HD CALL.

PC NETWORK

*DEFECTIVE SOFTWARE REPLACED. DEFECTIVE HARDWARE REPLACED OR REPAIRED. PRICES SUBJECT TO CHANGE.

Circle 135 on reader service card



SELECTION

PRICE



SOFTWARE



ALDUS
Pagemaker
3.0
\$479.

ADOBE Illustrator w/Windows \$428.
ALDUS Pagemaker 3.0 479.
ASHTON TATE DBase IV 453.
ASHTON TATE Multimate Adv. II 280.
BORLAND Turbo C w/Debugger 92.
BORLAND Turbo Pascal 99.
BORLAND Quattro 159.
BRODERBUND Where USA 26.
BRODERBUND Where World 25.
BRODERBUND Printshop 37.
BRODERBUND Bank St. Writer+ 47.
CENTRAL POINT PC Tools Delx. 42.
CHIPSOFT Pro 1040 228.
CHIPSOFT Personal 1040 46.
DAC Easy Accounting 3.0 59.
FIFTH GENERATION Fastback + 99.
FUNK SOFTWARE Always 85.
FUNK SOFTWARE Sideways 42.
INTUIT Quicken 30.
LOTUS Lotus 1-2-3 299.
LOTUS Symphony 445.
MECA Managing Your Money 117.
MERIDIAN Carbon Copy Plus 114.
MICROSOFT Flight Simulator 35.
MICROSOFT Word 5.0 CALL.
MICROSOFT Excel 2.0 315.
MICROSOFT Works 99.
MICROSOFT Windows 68/130.
PEACHTREE Business Acct. II 162.
PETER NORTON Utilities Adv. 77.
PFS First Choice 95.
PFS Professional Write 115.
PFS Harvard Graphics 285.
WORDPERFECT Wordperft.5.0 225.
XEROX Ventura Publisher 495.

PLOTTERS/DIGITIZERS

HOUSTON DMP 41, 42, 52, 61 CALL
HOUSTON DMP 52MP, 62MP CALL
ROLAND DXY 885 DXY980 CALL
CALCOMP 1023 CALL
SUMMASKETCH 12X12 379.
SUMMASKETCH 12X18 645.

SCANNERS

H.P. Scanjet w/Interface \$1455.
PANASONIC RS 505 Flatbed 995.
PANASONIC RS 506 Flatbed 1259.
MICROTEK MSF 300G 2650.
MICROTEK MSF 300C Flatbed 1350.
PRINCETON LS 300 w/Adaptor 758.
COMPLETE PC Handscanner 171.
LOGITECH Scanman CALL.

MICE

LOGITECH

Hi Res (Bus) 95.
Clear Mouse (Serial) 95.
C-7 (Serial or Bus) 79.
Mouse w/Paint (Bus or Serial) 88.

MICROSOFT

MOUSE w/Windows & Paint \$144.
MOUSE w/Paint & Menus 107.
MOUSE w/Easycad 124.

MODEMS

THE™ 2400 Internal \$99.
THE™ 2400 External 128.
THE™ 9600 Internal 379.
THE™ 9600 External 399.
HAYES Smartmodem 1200 295.
HAYES Smartmodem 1200B 295.
HAYES Smartmodem 2400 433.
HAYES Smartmodem 2400B 433.
US ROBOTICS HST 9600 625.

DISK DRIVES

SEAGATE ST-225 20MB/Kit \$279.
SEAGATE ST-251 40MB/Kit 469.
SEAGATE ST-251-1 40MB/28MS 435.
SEAGATE ST-4096 80MB/28MS 625.
MINISCRIBE 3650 40MB/Kit 377.
MINISCRIBE 3675 60MB HD/Kit 430.
MINISCRIBE 6085 71MB/22MS 642.
PRIAM ID230 230MB/RLL/12MS 1975.
MITSUBISHI 360K 5.25"HH 76.
MITSUBISHI 720K 3.5" HH 86.
MITSUBISHI 1.2MB 5.25"HH 93.
MITSUBISHI 1.44MB 3.5"HH 103.
SYSGEN Bridge File 3.5" Ext. Drive 225.

HARD CARDS

PLUS DEVELOP. Hard Card 20 \$545.
PLUS DEVELOP. Hard Card 40 690.
WESTERN DIGITAL File Card (30) 419.

TAPE BACKUP

MOUNTAIN 40MB Ext./Power XT \$569.
MOUNTAIN 40MB Ext./PS/2 Mdl30 549.
MOUNTAIN 150MB Ext. /PS/2 1550.
IRWIN 145C 40MB INT-/AT 469.
IRWIN 120D 20MB/XT 299.
PLUS DEVELOP. Pass Port 40 606.

CO-PROCESSORS/CHIPS

INTEL 8087-1 \$215.
INTEL 8087-3 109.
INTEL 80287-8 239.
INTEL 80287-10 279.
INTEL 80387-16 442.
INTEL 80387-20 540.
INTEL 80387-25 650.
THE™ 640K Upgrade Kit CALL.
THE™ Memory Upgrades CALL.

MULTIFUNCTION CARDS

AST 6Pack w/384K \$269.
AST Rampage AT w/512K 399.
AST Advantage Premium w/512K 426.
INTEL Above Board 286 w/512K 385.
INTEL InBoard 386 PC w/1MB 799.
ORCHID Tiny Turbo 269.
ORCHID Twin Turbo 379.
THE™ Multi I/O XT or AT 65.

ACCESSORIES

THE™ 3.5"DS/DD Bulk 25 \$32.
THE™ 5.25" DS/DD 50 Pack 19.
THE™ 5.25" DS/HD Bulk 25 19.
FUJI 3.5" DS/HD 10 Pack 49.
FUJI 5.25" DS/HD 10 Pack 21.
CH PRODUCTS Mach III Joystick 34.
CH PRODUCTS Game Card III 42.
PTI Datasield S100 59.
CURTIS Ruby Filter 6 Outlet 56.

FAX

CANON Faxphone 8 \$875.
CANON Faxphone 20 1250.
CANON Faxphone 25 1945.
SHARP FO220 995.
SHARP FO300 1199.
SHARP FO420 1299.
MURATA M1200 775.

JOIN PC NETWORK FOR SERVICE, SELECTION & PRICE.

✓ New "Net" Pricing... All Members Pay Prices Shown + Shipping.

✓ No Credit Card Surcharge on Master Card or Visa.

✓ Fast 24-Hour Shipping on all In-Stock Items.

✓ All Products on Display at Our Warehouse Showroom.

✓ Free Technical Support Before and After the Sale.

✓ Qualified Sales Representatives Standing by to Serve You.

MMC
MICROCOMPUTER
MARKETING COUNCIL
of the Direct Marketing Association, Inc.

PW0389

1-800-621-SAVE

• TECH SUPPORT 1-312-205-1410
• CUSTOMER SERVICE 1-312-205-1510
• FACSIMILE 1-312-205-1525

WordPerfect 5.0



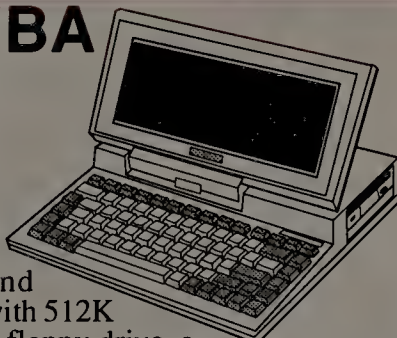
\$215

List \$495

The most popular word processor is now even better than ever! Version 5.0 adds multiple font support, graphics integration, page preview and much more. WordPerfect 5.0, still retains its feel and ease of use that made it #1. Combine this with the best support in the industry and you can't lose.

SPECIALS

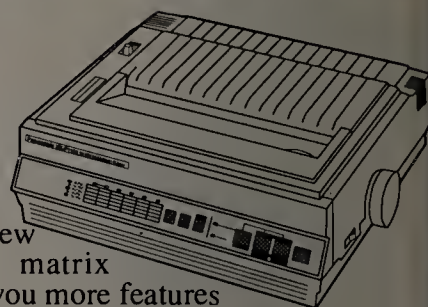
TOSHIBA T1000
\$749



The Toshiba T1000 is the perfect second PC! It comes with 512K of ram, a 720K floppy drive, a supertwist LCD screen and MS-DOS in rom! All this in a battery-powered 7 pound package. A 768K ram card is just \$269 and can be set as base, expanded, or a non-volatile ram disk.

Panasonic KX-P1124
24 Pin Printer

\$309



Panasonic's new 24 pin dot matrix printer gives you more features per dollar! It comes with paper parking and three paper paths for easy handling. The EZ-set operator panel lets you choose from five fonts, six pitches, perf cut and more. Its 11.7" carriage is perfect for envelopes or single sheets in landscape mode. All this and a two year warranty.

HARDWARE

PRINTERS

	LIST	FAST
ALPS		
Allegro 24	499	319
Citizen		
120D	229	145
180D	259	165
MSP40	449	299
Tribute 124	599	429
Diconix		
150P	499	299
Epson		Call
Fujitsu		
DL3400	995	549
NEC		
P2200	569	339
P5200	799	509
P5300	1049	669
LC890	4799	Call
Okidata		
182 Plus	319	219
320	499	329
390	699	469
393	1499	949
Panasonic		
KXP1080i-2	299	159
KXP1091i-2	329	179
KXP1124	529	309
KXP1595	749	419
KXP1524	949	519
KXP4450	2595	1499
Star		
NX1000	289	169
NX2400	499	309
NB2410	699	429
Toshiba		
P321SL	749	459
P341SL	999	599
P351SX	1499	929

BOARDS

	LIST	FAST
AST		
Hot Shot 286	645	339
Six Pak Plus 64K	210	119
DTK		
286 10mhz M/B	499	249
XT 1.2mb FDC	79	45
Everex		
1200B Int Modem	149	69
2400B Int Modem	249	129
Genoa		
Super EGA Hi-Res+	399	169
Super VGA #5100	445	239
VGA Hi-Res #5200	645	359
Hercules		
Graphic Card +	299	169
Intel		
8087-2	250	149
80287-10	480	249
Above Board Plus	795	419
Orchid		
ProDesigner	499	299
Tiny Turbo 286	445	269
Twin Turbo 12mhz	645	359
Paradise		
Autoswitch 480	349	Call
VGA Plus	399	259
VGA Plus 16	499	299
VGA Professional	799	Call
Practical Peripherals		
1200B Int Modem	99	65
2400B Int Modem	199	149
Prometheus		
Promodem 2400B	199	129
Promodem 2400G	249	159

The Complete PC

	LIST	FAST
Answering Machine	349	219
Fax	399	249
Hand Scanner	249	159
USRobotics		
1200 Baud Internal	149	69
1200 Baud External	179	89
2400 Baud Internal	249	119
2400 Baud External	279	149
Video 7		
Fast Write VGA	549	335
Vega Deluxe	379	Call
Vega VGA	499	259
V-RAM VGA	899	469
LAPTOPS		
Megahertz Modems		
2400B Toshiba	299	149
2400B NEC, Epson		
Mitsubishi or Zenith	399	199
Mitsubishi		
MP-286L Dual	3195	1879
MP-286L 20mb	4595	2449
NEC		
Multispeed EL II	2295	1449
Multispeed HD	3695	2249
Toshiba		
T1000	1249	749
T1200F	2099	1369
T1200FB Backlit	2399	1499
T1200HB Backlit	3599	2399
T1600	4999	3359
T3200	5799	3495
T5100	7499	4495
Zenith		Call

MONITORS

	LIST	FAST
Magnavox		
7BM749 VGA	229	149
9CM082 VGA	649	419
Mitsubishi		
1409 RGB	399	259
1410 EGA	599	399
Diamond Scan 1381	799	479
NEC		
Multisync II	899	575
Multisync Plus	1399	869
Princeton		
Max15	389	Call
Ultrasync	849	489
Ultrtra 16	1375	859
Seiko CM1430	995	599
Sony		
1302 Multiscan	995	659
1303 Multiscan	825	469
Zenith 1490	999	599

DISK DRIVES

	LIST	FAST
Miniscribe		
40MB AT #3650	499	319
Mitsubishi		
40MB AT MR535 22ms	825	399
Seagate		
20MB XT Kit #225	599	267
30MB XT Kit #238	699	287
40MB AT #251	899	349
40MB AT #251-1	999	449
80MB AT #4096	1199	549
Toshiba		
360K Floppy	119	69
720K 3.5" Floppy	149	79
1.2MB 5.25" Floppy	149	79
1.44MB 3.5" Floppy	189	99

Call On Non-Listed Items

SOFTWARE

Database

	LIST	FAST
Clipper	699	Call
DataEase	600	379
dBase IV	795	449
dBXL Diamond	199	105
Foxbase Plus	395	185
Paradox	725	429
Quartz	795	449
RapidFile	295	179
Rbase for DOS	700	419
Reflex	150	90
Q & A	349	179

Desktop Publishing

	LIST	FAST
Byline	295	175
GEM Desktop Pub.	299	169
Pagemaker 3.0	795	Call
PFS:First Publisher	129	69
Publisher's Paintbrush	285	149
Ventura 2.0	895	489

Financial

	LIST	FAST
Bedford Integr. Acct.	249	139
BPI	Call	Call
Computer Associates	Call	Call
DAC 3.0	99	59
DAC Payroll 3.0	99	59
Dollars & Sense	179	99
Managing Your Money	199	117
Peachtree Complete II	199	149
Turbo Tax 1040	75	42

Graphics

	LIST	FAST
Deluxe Paint II	105	67
First Graphics	129	Call
Freelance Plus	495	Call
GEM Artline	495	269
GEM Draw Plus	299	165
Generic Cadd Level 3	200	97
Graph Plus	495	299
Harvard Graphics	495	Call
Perspective Jr.	149	85
Integrated		
First Choice	159	Call
Works	149	89
Windows 286	99	59
Windows 386	195	117
Mice		
Logitech C7 Serial/Bus	119	65
Logitech HiRes Bus	150	79
Microsoft Serial/Bus	150	95
Microsoft W/ Windows	200	129
OmniMouse	89	45
PC Mouse II Serial/Bus	149	82
Power Protection		
Curtis Ruby Plus	115	59
Datasheild 85	90	50
Datasheild 100	99	57

Programming

	LIST	FAST
Macro Assembler	150	89
Norton Guides (Specify)	100	58
Turbo Basic	99	60
Turbo C 2.0	149	90
Turbo Pascal 5.0	149	90
Quick Basic	99	60
Quick C	99	60
Spreadsheets		
Allways	150	82
Excel	495	Call
Lotus	495	Call
Lucid 3-D	149	79
Quattro	248	149
Utilities		
CoreFast	149	87
Desklink	170	95
Desqview	130	73
Fastback Plus	189	99
FastTrax	60	37
Formtool	95	54
Laplink Plus	140	77
Norton Advanced	149	74
PC Tools Deluxe	80	36
Sidekick Plus	195	119
XTree	70	34

Word Processors

	LIST	FAST
Ami	149	89
Easy Extra	99	55
GEM First Word Plus	199	117
Grammatik III	89	49
Manuscript	495	Call
Multimate Adv. II	565	247
Professional Write	199	109
Rightwriter	95	49
Sprint	195	119
Q & A Write	199	109
Webster's Writer	60	47
Word	450	Call
Word Perfect	495	Call
Word Perfect Library	129	60
WordStar Prof. 5.0	495	219

Call On Non-Listed Items

TERMS: Most Orders Ship Within 48 hours. No Charge for Visa or MasterCard. Shipping Charge: 3% (Min. \$4). Product warranties, offers & claims are handled by the manufacturer. All returns are subject to 15% restocking fee, call for RA number. No returns on used items. Sorry, no COD's. Personal/company checks delay shipping. Compatibility not guaranteed. APO's add \$15. Prices/availability subject to change. AZ orders add 6.7% tax. For your protection, we check for stolen credit cards. Mailing Address: 3721 E. Grove St., Phoenix, AZ 85040. To place orders only call: 800-441-3278. To check on an order call: 602-437-8975.



COMPUTERS FROM IOWA SURPASS ALL OTHERS!

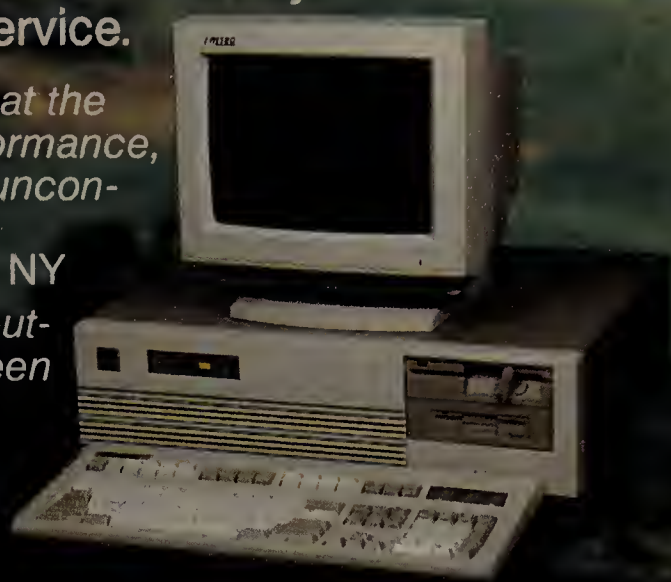
We at Gateway 2000 firmly believe that we are the best source for computers in the nation. We have over 2000 configurations available, all priced incredibly low and all backed by our unsurpassed service.

"We are very happy that our system is at the top of the stack in both price and performance, but it is your courteous service that is uncontested by the competition."

— Pierce Haviland — Kingston, NY

"Overall, I feel that your product is outstanding and your service has been excellent."

— Eric Shugren — Stonington, CT



16 Mhz 286 EGA*

1 Meg 70NS Ram
0 Wait State (S.L. 17.3)
1.2 Meg 5¼" Drive
1.44 Meg 3.5" Drive
40 Meg Hard Drive (28 MS)
1 to 1 Interleave
EVEREX EGA Board
14" EGA Monitor
1 Parallel / 2 Serial Ports
101 Key Keyboard
MS DOS w/GW Basic

\$2395.00

12 Mhz \$2195.00

25 Mhz 386 VGA

1 Meg 60NS Ram
Expandable to 8 Megs on MB
32 Bit Slot Open
1.2 Meg 5¼" Drive
1.44 Meg 3.5" Drive
80 Meg Hard Drive (28 MS)
1 to 1 Interleave
16 Bit VGA Board
NEC MULTI SYNCH II
1 Parallel / 2 Serial Ports
101 Key Keyboard
MS DOS w/GW Basic
80387 and Weitek Sockets
Vertical Style Case

\$3995.00

20 Mhz 386 EGA

1 Meg 60NS Ram
1.2 Meg 5¼" Drive
1.44 Meg 3.5" Drive
80 Meg Hard Drive (28 MS)
1 to 1 Interleave
EVEREX EGA Board
14" EGA Monitor
1 Parallel / 2 Serial Ports
101 Key Keyboard
MS DOS w/GW Basic

\$2995.00

386 SX \$2695.00

(Same configuration as above)

New



Steve Apiki & Stanford Diehl
Oct. 1988, **BYTE**
Review of 20 386

- "Emerging as truly exceptional..."
- "The Gateway delivers speed without sacrificing features."
- "The system ran without a glitch."
- "We were truly surprised to see a system of this caliber selling for less than \$3000."
- "When evaluating the whole package, The **GATEWAY 386** surpasses all the others!"



Gateway 2000 • P.O. Box 2000 • Sgt. Bluff, IA. 51054

800-233-8472 / 712-943-2000

All systems have a 30 day Money Back Guarantee and 1 Year Warranty.
Due to the Volatility in the DRAM Market all prices subject to change.

Circle 227 on reader service card

COMPUTER DISCOUNT WAREHOUSE™

SAMSUNG



S-330 4.77/10 MHz, 640K, 6 Slots, Built-in CGA, DOS 3.3, Enhanced Keyboard
S-330, 1 Floppy\$729.50
S-330, 20 Meg/40 Meg 974.95/995.82
S-550 AT Compatible 8/12 MHz, 8 Slots, 2S/PIC, Built-in EGA, DOS 3.3, Enh. Keyboard
S-550, 1.2M Floppy\$1220.45
S-550, 20 Meg/40 Meg 1569.80/1695.45
S-800, 386 20 MHz, 8 Slots, 1 Meg, 1.2 & 720 Floppies
S-800\$2570.69
S-800, 40 Meg/80 Meg 2990.01/3280.00
S-800, 40 Meg (28 ms) 3050.50

ZENITH data systems

Supersport Model 2 **CALL**
Supersport Model 20 **CDW™**
Supersport 286 Model 20 **FOR**
Supersport 286 Model 40 **ZENITH**
TurboSport 386 **PRICING**
TurboSport 386 w/Modem **CALL**



WHY PAY RETAIL?

Nobody Sells For Less

CALL FOR LOWEST CUSTOM QUOTES

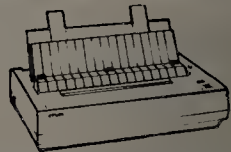
AT&T The right choice

6300 WGS\$1099.42
6312 WGS 1692.12
6386 WGS 3187.78
Model 63 4995.85
Model 64 5880.70
Model 75 6920.35
All WGS Models Come with Keyboard



EPSON

DFX5000
EX800
FX850



EPSON

FX1050 LQ950
LX800 LQ1050
LQ500 LQ2550
LQ850

LOWEST EVER EPSON PRICING

HARDWARE, SOFTWARE & PERIPHERALS AT DISCOUNT PRICES

COMPUTERS

AST SPECIALS

MDL 80\$1499.70 MDL 300\$2695.40
MDL 120 2280.05 MDL 340 3670.65
MDL 140 2649.55 MDL 390 5589.40
MDL 170 2998.36 CALL FOR NEW MODELS

AT&T

6300 WGS\$1099.42 Model 63\$4995.85
6312 WGS 1692.12 Model 64 5880.70
6386 WGS 3187.78 Model 75 5920.35

IBM PS2

MDL 30, 2 dr\$1249.20 MDL 50Z, 30 Meg \$2943.60
MDL 30, 20 Meg 1655.17 MDL 50Z, 60 Meg .NEW
MDL 60, 40 Meg 3340.15 MDL 70, All Mds. PS2s
MDL 80, 70 Meg 3567.50 MDL 80, 40 Meg 4497.67
MDL 80, 111 Meg 5950.80 MDL 80, 70 Meg 5330.30
MDL PS30286 1980.80 MDL PS30286, 20M SAVE

COMPAQ™

286, Mdl 1\$1769.55 386-20E, 100 Meg. .SAVE
286, 40 Meg 2455.20 386S, Mdl 40\$3762.20
286, 70 Meg 2891.20 386, Mdl 300 8620.50
386, Mdl 60 5435.30 Port. II, Mdl 2 1856.10
386, Mdl 130 6945.92 Port. II, Mdl 4 2797.00
386S, Mdl 20 3160.48 Port. III, Mdl 20 3495.85
386, 25MHz, Mdl 110 6995.95 Port. III, Mdl 40 4695.35
386, 25MHz, Mdl 300 8911.29 Port. 386 Mdl 40 5426.24
386-20E, 40 Meg SAVE Port. 386 Mdl 100 6669.74

LAZER TURBO

XT 1 drive\$639.19 XT w/40 Meg\$1024.74
XT w/20 Meg 928.29 XT w/70 Meg 1363.36
XT w/30 Meg 949.18

PACKARD BELL

PB286, 10 MHz\$1249.36
PB286, 12 MHz 1349.36
PB286 w/20 Meg 1573.50
PB286 w/40 Meg 1724.10
PB386 NEW MODEL

WYSE

MDL 2108\$939.50 MDL 2214\$1921.30
MDL 2112 1422.20 MDL 3216 2038.05

DRIVES, TAPES & CARDS

FLOPPIES, DRIVES & TAPES

1/2 height floppy drive\$99.00
MINISCRIBE 20/40 Meg 299.14/ 452.15
MINISCRIBE 30 Meg 1/2 height w/RL 345.95
MINISCRIBE 3085/6085 710.10/ 515.57
GENOA 60 Meg int. tape/ ext. tape 734.60/ 895.10
GENOA 150 Meg int. tape 1078.85
IOMEGA 20+20 External 5 1/4 1795.73
IOMEGA 8220X 1619.40
IRWIN 20 M/40 M Internal Tape 399.10/ 539.20
MOUNTAIN 4440 int./ext. 385.80/ 557.75
MOUNTAIN 150M FileSafe 1144.62
PLUS Passport 20 479.10
PLUS Passport 40 599.88
PLUS 20 & 40 System Kit 439.75
PLUS PS2 MC System Kit 585.58
PRIAM 40 Meg/60 Meg 669.55/ 749.95
PRIAM 130 Meg hard disk 1482.40
SEAGATE 20 Meg 1/2 height hard drive 289.69
SEAGATE 30 Meg 1/2 height w/RL 309.72
SEAGATE 40 Meg 1/2 height 399.50
SEAGATE 4096 80 Meg hard disk 645.10
SYSGEN 5 1/4 Ext. Floppy 225.25

HARD DRIVE CARDS

PLUS DEVELOPMENT 20 Meg\$569.55
PLUS DEVELOPMENT 40 Meg 749.80
WESTERN DIGITAL 30 Meg 416.30

PRINTERS

EPSON

DFX5000 CALL LQ500 ALL
EX800 COW™ LQ850 EPSON
FX850 FOR BEST LQ950 MODELS
FX1050 PRICE LQ1050 READY
LX800 EVER LQ2550 TO SHIP

DICOMINIX by Kodak

150P/300\$319.17/ 479.17
Pro Printer II\$429.95 Quickwriter III 1295.62

IBM

P2200\$369.65 5200\$532.25
3550 185.59 5300 696.47
P960XL\$1067.70 8850 1080.75

OKIDATA

ML 182S\$279.76 ML 321\$479.28
ML 182P 232.50 ML 390 475.96
LASERLINE 6 1286.69 ML 391 648.48
ML 294 737.10 ML 393 969.55
ML 320 346.63 ML 393 Color 1057.60

PANASONIC

1080i\$179.60 1091i\$219.85
1124 344.97 1592 433.44
1092i 299.28 3131 299.32
1595 459.45 1524 579.10
3151 446.52 CALL FOR ACCESSORIES

CITIZEN

120D\$199.55 MSP55\$579.66
MSP40 299.80 Premiere 35 577.17
MSP50 352.10 CALL FOR ACCESSORIES

ALPS

Allegro 24\$353.50

LAZER PRINTERS

H-P Laser Jet Model 2\$1719.40
H-P Laser Jet IID 2995.95
H-P Deskjet 696.00
NEC LC890 3199.60
PANASONIC Laser 1599.35
TOSHIBA PageLaser 2497.15

CHIPS

8087-2/ 8087-3\$149.90/ 112.20
80287-6/ -8/ -10 154.30/ 216.55/ 285.25
80387-16/ 80387-20 399.69/ 465.65
80387-25/ 80387-SX 569.92/ 370.82
80387-A 395.50

PLOTTERS, DIGITIZERS & SCANNERS

CALCOMP

1023\$3838.38 1043\$6477.15
1042 7539.95 1044 9915.06

KURTA

1212IS1\$349.06 36x48\$2891.53
12x17 499.35 4 Button Cursor 75.00

ROLAND

DXY-885\$1149.79 DPX-2000\$3464.12
DXY-990 1457.82 DPX-3300 4689.52

SUMMASKETCH

12x12\$376.30 12x18\$632.50

HEWLETT PACKARD

HP7440A\$968.30
HP7475A 1417.44
HP7550 2926.56
HP7570 LOWEST PRICE
HP SCANJET SAVE

HOUSTON INSTRUMENTS

HI DMP-52/52MP\$1599.95
HI DMP-56A 1225.44
HI DMP-62 1085.17

FAX MACHINES

SHARP FO-220\$950.48 SHARP FO-500\$1599.95
SHARP FO-300 1225.10 TOSHIBA 3010 1225.44
SHARP FO-420 1399.95 PACK. BELL FAX200 1085.17

NOVELL NETWORKING

SANTA CLARA Diskless Workstation\$640.40

SOFTWARE & STARTER KITS

Entry-level 286 Starter Kit, 4 Users\$489.90
Entry-level 286 Starter Kit, 8 Users 899.89
NOVELL 286 Software V. 2.12 1676.34
NOVELL SFT Netware Level II V2.1 2486.60

INTERFACE CARDS

3COM ETHERLINK\$417.29
ARCNET PC120 LANboard PS2 539.40
ARCNET PC120 LANboard 174.27
ARCNET PC220 LANboard 199.50
ETHERNET Interface Connector 329.80
ETHERNET Plus Board (for 286) 698.74
G-NET Interface Card w/cable 296.52
TIARA 110 Lan Board 149.80
WESTERN DIGITAL Ethernet Cards 249.10

ACCESSORIES

ARCNET Passive Hub\$74.00
ARCNET Active Hub 395.10
Ethernet Terminators 39.50
TIARA Active Hub 372.50
Novell trained and authorized sales and support.
Call CDW for all new Software versions.

TERMINALS

WYSE 50, Amber or Green\$373.40
WYSE 60, Amber or Green 299.10
WYSE 85/30 Amber 399.20/ 299.30

MODEMS & COMMUNICATIONS

AST 5251-11 Plus\$599.99
EVEREX 1200B/2400B 109.90/ 199.50
EVEREX 2400 Ext/2400 PS/2 199.80/ 205.45
IRMA 3278/79 695.17
MEGAHERTZ 2400B 229.29
PACKARD BELL 2400 Int/2400 Ext 169.95/ 199.22

Hayes

HAYES 1200\$289.60 2400B\$379.65
1200B 269.20 2400PS2 399.15
2400 424.68

U-Robotics

Courier 1200\$179.80 1200 External\$129.10
Courier 2400 299.80 2400B 199.70
1200B 108.45 9600 HST 665.20

VenTel

1200 Int.\$194.50 2400 Int.\$299.10
1200 Plus 228.88 2400 Ext. 389.44

BATTERY BACKUP & SURGE

PERMA POWER 6 Outlet Surge Supp.\$34.40

TRIPLITE

BC-450\$407.78 4 outlet\$44.25
BC-1200 765.55 LC-1200 159.85
BC-2000 1179.80 LC-1800 146.85

DATASHIELD

500 Watt\$560.05 1200 Watt\$994.75
800 Watt 638.50 6 Outlet Surge 27.85

MISC. & ACCESSORIES

A-B Switching Box (par. or serial)\$39.95
BASF 5 Pack of 10 OS/DD w/case 39.00
KENSINGTON Masterpiece 99.99
KENSINGTON Masterpiece Plus 123.40
KEYTRONICS 5151 IBM or AT&T 149.95
KEYTRONICS 101 97.95
Printer Cable (IBM to Centronics) 6 ft. 19.99
XT Power Supply 150 Watt 59.00

SOFTWARE

WORDPERFECT 5.0 5 1/4 / 3 1/4\$219.90/ 228.90
dBase III+ / dBase IV 424.00/ 476.10
LOTUS 1-2-3 5 1/4 / 3 1/2 305.00/ 327.00
BORLAND QUATTRO 149.52
MERIDIAN Carbon Copy 119.37
Ventura Software Version 2.0 489.00

MONO MONITORS & CARDS

CDW™ color/ mono cards w/p\$9.00/ 89.00
HERCULES color/ mono cards w/p 146.14/ 179.84
TAXAN mono card w/p 89.00
AT&T Monochrome Monitor 189.40
AMDEK 410A/ 1280 149.99/ 679.78
COMPAQ Mono/ VGA Mono 193.10/ 209.95
IBM PS2 8503 209.95
IBM PS2 8512/ 8513 436.40/ 519.20
NEC Monograph 1297.25
PGS MAX 12E/ MAX 15 139.40/ 258.20
PACKARD BELL Green or Amber 89.95
TAXAN 123 Green/ 124 Amber CALL

COLOR GRAPHIC MONITORS

SAMSUNG RGB Comp\$248.60
TAXAN 720 299.80
MAGNAVOX 8762 259.05

VGA & EGA PRODUCTS

VGA & EGA MONITORS

COMPAQ VGA monitor\$548.68
MAGNAVOX 943EGA/ 9CM062 365.40/ 372.52
MITSUBISHI 1410 385.50
MITSUBISHI Diamond Scan 522.20
NEC Multisync II/ PLUS 599.75/ 888.10
NEC Multisync XL 19 inch 2080.40
PACKARD BELL VGA Monitor 389.95
PGS Ultrasync 525.33
SONY Multiscan 1303/ 1302 519.45/ 549.25
TAXAN 770 + / 765 IN STOCK
ZENITH Z-1490 648.80

VGA DISPLAY CARDS

ATI VGA VIP\$289.24
GENOA 5200/ 5300 330.55/ 274.20
MAGNAVOX VGA 247.10
RENAISSANCE RVGA 219.05
PARADISE VGA 297.68
ORCHID VGA 278.14
VIDEO-7 VGA 299.15

EGA DISPLAY CARDS

VIDEO 7 Fast Write\$372.15
VIDEO 7 VRAM VGA 488.25
GENOA Super EGA Hi-Res 800 x 600 234.40
NEC MVA 1024 960.50
PARADISE Auto Switch EGA 480 179.65
TAXAN 570 800x600 199.95
VIDEO 7 Vega Deluxe 249.74

CAD MONITORS & CARDS

MITSUBISHI G905, 19 inch\$2320.90
HITACHI 4119, 19 inch 2310.65
CONTROL SYSTEMS ARTIST 1016 1779.20
SIGMA Laserview 1764.18
VERMONT Cobra 2977.75
METHEUS 1104 985.58

MICE

LOGITECH HiRez\$99.95
LOGITECH C7/ Bus 89.95/ 109.06
LOGITECH Logimouse C7 w/publisher 124.85
MICROSOFT Mouse (Bus Version) 109.34
MICROSOFT Mouse (Serial Version) 117.25
MOUSE SYSTEMS (Serial Version) 93.55
MOUSE SYSTEMS (Bus Version) 108.77
MOUSE SYSTEMS Omnimouse 59.70

MOST ORDERS SHIPPED WITHIN 48 HOURS.

HIGH VOLUME BIDS INVITED
2840 Maria Avenue, Northbrook, IL 60062 FAX-A-BID (312) 291-1737

If you find a better price call us before you buy.

WHY WAIT? CALL COMPUTER DISCOUNT WAREHOUSE™ NOW!

Open terms available to approved credit

(800) 233-4426

In Illinois FAX
(312) 498-1426 (312) 291-1737

SPECIAL EXTENDED HOURS

Sales 7:30-7:30 CST Mon-Fri.
9:00-3:30 CST Sat.
Tech. Support 9:00-5:00 CST Mon-Fri.

Credit Card charges are not submitted until time of shipment. Shipping and handling additional. On all hard drive orders and orders under \$200.00 please add \$5.00 handling fee. Non-defective returns subject to restocking fee. All prices reflect 3% discount for cash. Allow 10 business days for shipping when paying by personal check. Software, chips and other electronic components are not returnable. All pricing subject to change. TM - Registered trademarks of IBM and COMPAQ.

Credit card charges are not submitted until time of shipment



CHARTER MEMBER

MMC
MICROCOMPUTER
MARKETING COUNCIL
of the Direct Marketing Association, Inc.
MEMBER A319

K E N O S H A



PACKARD BELL TURBO XT only \$1029

10 MHz • 640K Ram • 1 Floppy Drive •
20 MB Seagate Hard Disk • Parallel
and Serial Ports • Clock • Mono/Color
Graphics Card • Monochrome Amber
Monitor • AT Style Keyboard • DOS &
Basic • Word Processor, Desktop
Manager and Utility Software •
Sorbus Warranty Service 1 year warranty

KENOSHA COMPUTER CENTER

SALES LINE OUTSIDE WISCONSIN
1-800-255-2989



(in Wisconsin Call
414-697-9595)

Shipping & technical assistance 414-697-9595



ZENITH data systems

SUPERSPORT 286 w/20 MB Hard Disk

only **\$3025**

Supersport 286
w/40MB Hard Disk.....\$3549

IBM

All Models..... CALL

COMPAQ

286 Deskpro 640K 40MB..\$2199
386 Deskpro Model 60 ..\$4995
386 Deskpro Model 130..\$6395
386S Model 1 ..\$2895
386S Model 20 ..\$3395
386S Model 40 ..\$3795
386 25MHz w/110MB\$7395
386E w/40MB, 20MHz...\$4749
386E w/110MB, 20MHz..\$5749
Portable II Model 4.....\$2795
Portable III, 20MB ..\$3595
Portable III, 40MB ..\$4195
SLT Lap Top..... CALL

LEADING EDGE MODEL D

1 floppy, 20MB hard disk, mono
graphics card & monitor, DOS &
Basic\$1099

PACKARD BELL

VT286 w/40MB\$1549

AST

286 w/512K, 40MB\$1849
386 w/1MB\$2795

LAP TOPS

Zenith Supersport 20....\$2329
NEC Multispeed EL.....\$1495
NEC Multispeed HD.....\$2259
Toshiba T1000\$809
Toshiba 1100 Plus\$1519
Toshiba 1200\$2235
Toshiba 3100\$3029
Toshiba 3200.....\$3649
Toshiba 5100\$4799

CHIPS

64K Ram Chips..... CALL
256K Chips CALL
8087-3/8087-2\$105/\$145
80287-6MHz\$155
80287-8MHz\$229
80287-10MHz\$269
80387-16MHz\$419
80387-20MHz\$549
80387-25MHz\$659

HARD DISKS

SEAGATE

20MB w/contr ST225\$265
30MB w/contr ST238\$279
30MB for AT ST4038\$465
40MB for AT ST251\$349
40MB for AT ST251-1\$459
80MB for AT ST4096\$575

PLUS

Hard Card 20MB\$525
Hard Card 40MB\$669

SOFTWARE

D Base IV.....\$459
Framework\$389
IBM Displaywrite IV\$299
Lotus 123\$299
Managing Your Money 4.0 ..\$119
Microsoft Word\$215
Multimate Adv. II.....\$259
Quattro\$149
R Base for DOS\$409
Symphony\$429
Ventura Desktop Publ....\$489
Word Perfect 5.0\$219
Wordstar 2000 Plus\$229
Wordstar Pro 4.0\$229

MONITORS

Compaq VGA\$539
Mitsubishi Diamondscan ..\$519
NEC Multisync II.....\$579
NEC Multisync Plus\$879
NEC Multisync GS\$199
NEC Multisync XL\$2049
Thomson Ultrascan\$449
Packard Bell Color\$239
Packard Bell EGA\$369
Packard Bell VGA\$379
Princeton Ultrasync.....\$509
Sony Multiscan\$559
Zenith 1490\$619

GRAPHICS CARDS

ATI EGA Wonder 800\$225
ATI VIP VGA\$269
Compaq VGA\$409
Everex Enhancer\$159
Everex Edge\$179
Everex VGA\$249
Hercules Graphics Plus\$179
NEC GB-1\$209
NEC MVA 1024\$829
Paradise Autoswitch 480 ..\$175
Paradise Professional\$399
Paradise VGA Plus\$269
Paradise VGA Plus 16\$299
Quadram VGA\$259
Quadram Ultra VGA.....\$299
Sigma VGA\$249
STB EGA Plus\$159
Vega Deluxe\$199
Vega VGA\$265

MULTIFUNCTION CARDS

AST 6 Pack Plus w/384K ..\$239
AST Rampage PC w/256K ..\$249
AST Rampage AT w/512K ..\$425
AST 5251-II Plus Enhanced \$579
Intel Above Board PC.....\$229
Intel Above Board PC P/S ..\$259
Intel Above Board 286....\$369
Intel Above Board 286 P/S \$389
Intel Inboard PC\$709
Intel Inboard AT\$1039
Irma Board\$695
Orchid Tiny Turbo 286\$249
2MB & 4MB Upgrades
for PSII CALL

MICE

Logitech Serial or Bus\$74
w/Paint\$99
w/Cadd\$117
w/Publisher\$109
Logitech Hirez\$95
Logitech PSII\$75
Microsoft Serial w/Paint ...\$105
Microsoft Bus w/Paint\$105

PRINTERS

EPSON

LX 800 ...\$189 LQ 1050 ..\$719
FX 286E ..\$419 LQ 500 ..\$299
FX 850 ..\$339 LQ 2550 ..\$919
FX 1050 ..\$479 EX 800 ..\$429
LQ 850 ..\$519 DFX5000
LQ 950 ..\$589\$1355

OKIDATA

ML320...\$339 ML391...\$639
ML321...\$465 ML393...\$925
ML390...\$465

NEC

P2200 ...\$339 P5XL\$849
P5200 ...\$539 P9XL\$1049
P5300 ...\$689

HEWLETT-PACKARD

Laserjet II.....\$1699
Memory Upgrade
25-In-1 font\$279
Deskjet\$759
Laserjet IID\$3195

IBM

Proprinter\$389
Proprinter XL\$549
Proprinter X24\$549
Proprinter XL24\$725

MODEMS

Everex 1200/2400 Int. .\$.79/\$139
Everex 2400 External\$199
Hayes 1200\$279
Hayes 1200B Alone\$244
Hayes 1200B w/Software ..\$279
Hayes 2400 ext\$409
Hayes 2400B Int.....\$377
Hayes 2400B w/software ..\$419
US Robotics 2400 Int\$149
US Robotics 2400 ext\$162
US Robotics 1200 Int.....\$84
US Robotics 1200 ext\$98
US Robotics Cour. 2400 ...\$279
US Robotics HST 9600\$625
2400 Internal IBM PSII\$189

FAX MACHINES

Sharp FO-300\$1219
Sharp FO-420\$1339

KENOSHA
COMPUTER CENTER
2133 91st St
Kenosha, WI 53140

No charge for MasterCard or Visa. We will ship COD on a cash or cashier's check basis only. Shipping & handling 3% — \$6 minimum. AK and HI slightly higher. 15% restocking charge on returned items. Purchase orders accepted from Fortune 1000, Government institutions, schools and universities. 2% shipping discount available on orders over \$2000 if prepaid by check.

C O M P U T E R C E N T E R

Prices and availability
subject to change

Circle 41 on reader service card

Designer Carry Case for Laptops: Extra pockets for portable printer, battery pack, pocket modem, manuals & software etc. Comes with handle and shoulder strap. For NEC EL & HD and all Toshiba Laptops. Specify model.

Only 149

With any Laptop 130

TOUCH BASE Systems World Port Pocket Modems: Both 1200 & 2400 use own battery. Operate on Bell and CCITT standards. 2400 includes AC Adapter and Carbon Copy PLUS comm sw. Comes with 25 pin female connector. For Toshiba adapter cable, add 20.

1200/2400 159/259 With any Laptop: 1200/2400 150/250



QUADRAM JT Fax Portable slips into your pocket and plugs into any MS DOS computer's serial port to let you fax from wherever you are. JT Fax board goes into your PC. All come with software.

JT Fax 4800/9600 279/549

JT Fax Portable 339

SHARP FAX MACHINE: Group 2, 3 Compatible. Auto contrast control and half tone transmission. 10 page auto feeder. Activity and transaction reports. Copy function. Automatic redial. 32 auto dialing numbers. Built-in phone.

FO-220 (Beige) 899

UX-180 (Black) 899

★ **DICONIX 150** Parallel w/3' Cable 299

With Purchase of Any Laptop 269

★ **NEC P2200** 319 ★

SYSTEMS	PRINTERS	MONITORS	FAX MACHINES/BOARDS
NEC MultiSpeed EL II 1479 MultiSpeed HD w/20 MB 2299 Battery Pack-Specify EL or HD . . . 99 Carry Case: EL/HD 99 Floppy 5.25" Ext 360K for HD . . . 299 NEC Modem 1200/2400 Int . . . 269/339 TOSHIBA LAPTOPS T1000 w/out Carry Case 749 T1000 w/Toshiba Carry Case . . . 799 T1000 w/Case & 768K Card . . . 1089 T1200F, 2 floppy w/out CC . . . 1279 T1200FB, Backlit w/out CC . . . 1469 T1200H, 20MB w/out CC . . . 2139 T1200HB, Backlit w/out CC . . . 2249 T1600 w/out Carry Case 3099 T3100E w/out Carry Case 2629 T3200 w/out Carry Case 3349 T5100 w/out Carry Case 4349 T5200-40MB w/out CC 5999 T5200-100MB w/out CC 6999 ACCESSORIES for Toshiba LapTops With Laptop Use Second Price AC Adapter: T1000/1100+ . . . 75/60 AC Adapter: T1200 99/80 Auto Adapter: T1000/1100+ . . . 65/50 Battery Charger: T1200 239/210 Battery Pack: T1200 85/70 Battery Backup: T5100 299/280 Carry Case for T1000 or T1200 . . . 60 Carry Case for T3200 or T5100 . . 90 Designer Carry Case w/pockets for SW, manuals, portable printer etc. Specify model 149/130 Expansion Chasis w/interface for 1100+/1200 or 3100/5100 . . . 869/829 WonUnder: Expansion slot for 1100+, 1200 or 3100/5100 269/250 Floppy 5.25" Ext 360k 299/270 Memory 768k: T1000 299/290 Memory 1MB: T1200/T3100 . . . 599/570 Memory 2MB: T3100E 929/890 Memory 3MB: T3200 1239/1200 Memory 2MB: T5100 1049/1020 Modem 1200 Int: T1000 319/300 Modem 1200 No Slot: T1200 . . . 299 When installed 350 Modems: T1100+/1200/3100/5100 Toshiba 1200 Int 299/280 Megahertz 1200 Int w/sw . . . 169/159 Megahertz 2400 Int w/sw . . . 279/259 Prometheus 1200 Int w/sw 149/139 Prometheus 2400 Int w/sw 329/300 Adaptamodem 2400 Int 329/300 World Port 1200 Ext 159/150 2400 Ext w/AC Adapter . . . 259/250 Toshiba cable for Ext Modems . . 20 Numeric Keypad: T1000/1200 . . . 99/90 Numeric Keypad: T3100E 99/90 Brooklyn Bridge 99/90 Battery Watch by Traveling sw . . . 39 Desk Link by Traveling sw . . 129/120 Laplink Plus by Traveling sw 109/100	ALPS Allegro 24 pin 359 ALQ 224E Color 599 ALQ 324E Color 749 BiDi Tractor: 200/300 70/90 Ribbon: ALQ Black/Color . . . 15/20 P2000 w/Tractor 679 P2100 w/Tractor 1079 P2400 Color, w/Tractor 24 pin . . 969 ★ DICONIX InkJet 150 parallel with 3' or 6' cable 299 With any Laptop 269 NEC P2200 319 5200/5300 515/689 Color Kit 5200/5300 109 Cut Sht Fdr 5200/5300 . . . 169/199 ★ TOSHIBA ExpressWriter 311.. 399 ★ ★ TOSHIBA 321SL 439 ★ ★ TOSHIBA 341SL 579 ★ KENSINGTON Printer Stand . . . 20 ★ With Printer 10 ★ DRIVES & BACKUP PLUS HARD CARD: Single Slot 20/40 MB 499/649 TOSHIBA 3.5" Int 1.44MB with Universal mounting kit 109 SEAGATE: For PC/XT HALF HT PRO PACK 20 MB (ST 225) . . . 289 PRO PACK 30 MB (ST 238) . . . 299 Fully Pretested, PRO PACK includes controller, cables, detailed & illustrated manual. Six months warranty. PC/XT Mtng Kit & Filler Plate . . . 10 FOR AT: 40 MB w/partitioning sw SEAGATE ST 251-1 28 ms . . . 399 MOUNTAIN: Uses Floppy Cont/DC2000 Back-up 40 MB: Internal for AT . . 379 DC 2000 Single/Box of 5 . . . 25/120 DC 600 Single/Box of 5 . . . 30/140 SOFTWARE BORLAND Sidekick: Specify 5.25 or 3.5 35 BORLAND Sprint - 3.5" 69 LOTUS symphony 3.5" Ver 1.2 . . 199 LOTUS Metro 3.5" Ver 1.0 . . . 35 PC Paint Plus 29 Gem Graph 49 Brooklyn Bridge 99 Battery Watch by Traveling sw . . 39 Desk Link by Traveling sw . . . 129 Laplink Plus by Traveling sw . . . 109 Microsoft Windows 386 99 ★ TOSHIBA 321 SL/341 SL 439/579 ★ ★ FREE DELIVERY ★ ★ PREPAID ORDERS IN CONTINENTAL USA ONLY ★ Simply mail the check for the exact amount (CA add 6%) as shown here with your order. We will ship your order UPS Ground, FREE of any other charges. It is that simple. For 2 Day AIR shipment, add 3% (Min \$10). For Printers & Monitors 6% (Min \$30). Money order/Bank check orders shipped immediately. Personal/Co. checks delay shipment 2/3 weeks. (Credit Card orders are not considered prepaid).	With Display Card . . Use 2nd Price LOGITECH AutoSync with EGA Card, LogiMouse & Paint Show . . . 569 MITSUBISHI D Scan 1371 . . . 449/430 Diamond Scan 1381 499/480 Diamond Scan Tilt & Swivel - add 20 NEC MultiSync II-1402 599/579 NEC MultiSync PLUS 999/970 SONY 1311CR-13" Trinitron Color Remote TV & RGB Monitor 449/430 Sony 1311 to IBM Cable 20 SONY Multiscan 1303 529/510 SONY Multiscan 1302 659/640 Sony 1303/2 to IBM Cable 20 Sony 1303/2 to MAC II Cable . . . 30 TAXAN 770 MultiVision plus 529/500 ZENITH ZCM-1490 Flat Screen . . 649/620 With Zenith Tilt & Swivel . . 669/640 Zenith Tilt & Swivel 30 UNIVERSAL Tilt & Swivel 25 MATH/RAM CHIPS 64K RAM 120ns Set of 9 30 256K RAM 120ns Set of 9 CALL 8087-3 PC/XT 5 Mhz 115 8087-2 PC/XT 8 Mhz 145 80287-6 AT 6 Mhz 169 80287-8 AT 8 Mhz 239 80287-10 AT 10 Mhz 279 80387-16 for 386 Machines . . . 399 80387-20 for 386 Machines . . . 499 MODEMS LAP TOP Modems See SYSTEMS EVEREX 1200 Int w/BitCom . . . 89 2400 w BitCom Int/Ext 169/199 HAYES 1200B Internal-No SW . . 219 1200B with SmartCom II 269 PROMETHEUS 2400G Ext 179 TOUCHBASE SYSTEMS World Port 1200 Ext 159 2400 Ext w/AC Adapter 259 U S ROBOTICS Sportster 2400 Int/Ext 169/199 ZOOM HC 2400 Int./Ext. . . 129/149	PANAFAX UF-155 999 SHARP FO-220 899 SHARP UX-180 899 SHARP FO-420 1199 SHARP UX-350 1199 MURATA M1200/M1600 . . . 659/759 QUADRAM JT Fax 4800/9600 . . 279/549 JT Fax Portable 339 THE COMPLETE PC Fax Brd 4800 269 Fax Board 9600 469 Answering Machine-Voice Mail 239 DISPLAY CARDS ATI VGA Wonder (256k) 339 GENOA SuperEGA HiRes+ . . . 179 SuperVGA HiRes 5200-10 . . . 379 ORCHID Pro Designer VGA . . . 329 PARADISE AutoSwitch 480 . . . 199 Paradise VGA Plus 289 Paradise VGA Plus 16 339 Paradise VGA Professional . . . 529 VIDEO-7 Vega VGA 299 Vega V-RAM VGA (256k) 499 ZENITH Z-449 279 9 to 15 Pin Connector-Required for some Monitor/Card combinations . 20 KEYBOARD/MOUSE KEYTRONIC 101 Keys for IBM PC, XT, AT with Function Keys on top row, separate Cursor Control Keypad and Numeric Keypad. With 3 years Keytronics warranty 99 OEM Version: Identical Keyboard w/90 day warranty from us 69 LOGITECH with Plus software PS/2 Mouse 79 C-7 Serial or Bus 79 HiRez Bus 89 Logitech Publisher 30 LogiPaint/LogiCadd 15/30 MICROSOFT Mouse: Bus or Ser . . 109 With Windows: Bus or Serial . . 129 MOUSE SYSTEMS PC Mouse: Serial or Bus with PC Paint Plus . . . 99 POWER REPLACEMENT POWER SUPPLIES For PC XT 150 Watts 69 DATASHIELD Surge Pro 100 . . . 79 300 Watts Turbo Backup 399 450 Watts Turbo Backup 469 625 Watts Turbo Backup 569 SOLID STATE UPS 3" High SS400/SS700 699/829 KENSINGTON Masterpiece 99 Masterpiece Plus 109 Masterpiece Remote 109

MICROBEST

714-897-2100

13605 HOOVER STREET, GARDEN GROVE, CA 92641

PLEASE REFER TO AD # 9W-07

LycO Computer

Marketing & Consultants

Since 1981

Air Orders Processed Within 24 Hours

CITIZEN

Mate/12

\$1349⁹⁵

World class competition in an 80286 PC/AT from Citizen. One MB RAM is standard, along with 2 serial and 1 parallel port, EGA video card and keyboard switchable 6.25/12.5 MHz for full PC/AT compatibility. Citizen also includes added features such as, switchable 150 watt power supply, 1.2 MB 5.25" floppy drive, MS-DOS-GW Basic software to provide for your immediate computing needs. Leave the competition behind with the Citizen Mate 12 Plus.



Monitor Optional

Pick up on the T-1000 and you'll go far. Give yourself desktop PC power wherever you need it. Toshiba's T-1000 includes 512K RAM, one built-in 720KB 3.5" disk drive, supertwist LCD display with CGA capability.

**Toshiba
T-1000**

\$799⁹⁵



MAGNAVOX

9CM-053



For full EGA capability, the Magnavox 9CM-053 should be your choice. This 14" CRT provides 690 H x 390 V resolution with text modes in both green and amber. Add to this a two-year warranty and you'll decide to stay smart with Magnavox.

\$349⁹⁵

VENDEX[®]

- IBM XT Compatible with Award Bios
- Small Footprint
- 8088-1 Turbo Processor with 4.77 or 9.54 MHz Software Switchable
- 640K
- 2-360K Floppy Disk Drives or 1 Floppy Drive
- Parallel Printer Port
- RS232 Serial Port
- Clock Calendar with Battery Backup on Board
- AT Style 84 Key Keyboard
- CGA/MGA and Hercules Graphics Adaptor
- 6 Total Empty Slots
- 135 Watt Power Supply
- MS-DOS Version 3.3
- GW-Basic
- Easy Working Writer (Word Processor by Spinner)

VTI-33-XT

Amber Monitor Included

\$699⁹⁵



Seagate

**ST138R 30 Meg
Internally Mounted
Card**

- Premounted on its own Controller Card
- EZ Slot Installation (app. 10 min.)

\$329⁹⁵

20-30-49 meg drives available!

LASER

Monitor Optional

**Turbo XT
Model II**

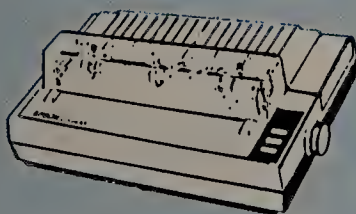
\$629⁹⁵

Out perform the conventional PC/XT competition with Laser's Turbo XT-II. The Laser provides everything you expect from an XT plus such standard features as 4.77/10 MHz speed, 102 key enhanced keyboard, security lock and a clock/calendar with battery backup. Laser's compatibility is guaranteed through a 150W power supply, four accessible drive slots, (1 360K 5.25 standard) 8 I/O expansion slots, parallel centronics and RS 232 interfaces, 640K RAM standard, (expandable to 1.6 MB) along with a CGA video card already installed. Introduce yourself to the new generation XT through Laser's Turbo XT-II.



EPSON[®]

LQ-500



- 24 pin
- 180 cps (12 cpi)
- 60 cps NLQ (12 cpi)
- friction feed

\$305⁹⁵

Panasonic
Office Automation **OA**

KXP4450 Laser Partner

\$1429⁹⁵



Move your business in the laser age with Panasonic. 512K memory comes standard. 11 pages per minute print speed makes it the fastest in its class. Panasonic's laser technology and 2-year warranty — commitment to your printing needs.

star[®]
MICRONICS

**NX-1000
RAINBOW**



\$225⁹⁵

The Star NX 1000 Rainbow adds a whole new dimension to your work through multi-color printing. Star has designed 20 printing options into this printer. Add to this paper parking, Epson-IBM emulation, high resolution NLQ/graphics for a printer with extra talent over the competition. Star's NX 1000 Rainbow does all the work.

1-800-233-8760

L Lyco Computer

Marketing & Consultants

Since 1981

Air Orders Processed Within 24 Hours



PRINTERS

Seikosha

SP 1200 AS RS232 ..	\$189.95
SP 1600 AI	\$189.95
SP Series Ribbon	\$7.95
SK 3000 AI	\$369.95
SK 3005 AI	\$419.95
SL 130 AI	\$599.95
MP 5420 FA	\$999.95
SBP 10	\$CALL

Brother

M1509	\$335.95
M1709	\$439.95
Twinwriter 6 Dot & Daisy	\$899.95
M1724L	\$569.95
HR20	\$345.95
HR40	\$599.95
HR60	\$649.95

Star

NX-1000	\$169.95
NX-1000C (C-64)	\$169.95
NX-1000 Color	\$225.95
NX-1000C Color (C-64)	\$229.95
NX-15	\$289.95
NX-2400	\$309.95
NR-10	\$319.95
NB24-10 24 pin	\$399.95
NR-15	\$419.95
NB24-15 24 pin	\$545.95
NB-15 24 pin	\$669.95
Laser 8	\$1759.95

Toshiba

321 SL	\$459.95
341 SL	\$619.95
351 SX 400 cps	\$919.95

Citizen

120 D	\$149.95
180 D	\$159.95
MSP-40	\$279.95
MSP-15E	\$329.95
MSP-50	\$369.95
MSP-45	\$389.95
Tribute 124	\$389.95
MSP-55	\$459.95
Premiere 35	\$499.95
Tribute 224	\$589.95

Epson

LX800	\$185.95
LQ500	\$305.95
FX850	\$345.95
EX800	\$369.95
FX1050	\$449.95
LQ850	\$529.95
LQ1050	\$739.95
FX-5000	\$1399.95

Okidata

Okimate 20	\$129.95
Okimate 20 w/cart	\$189.95
182	\$209.95
180	\$219.95
182+	\$229.95
183	\$259.95
320	\$339.95
292 w/interface	\$449.95
390	\$479.95
293 w/interface	\$585.95
391	\$649.95
294 w/interface	\$799.95
393	\$1029.95
Laser 6	\$1349.95

Panasonic

1080i Model II	\$149.95*
1091i Model II	\$179.95*
1092i	\$309.95
1592	\$375.95
1595	\$439.95
3131	\$289.95
3151	\$CALL
KX-P 4450 Laser	\$1429.95
1524 24 Pin	\$559.95
Fax Partner	\$579.95
Optical Scanner	\$859.95
1124	\$319.95
1180	\$179.95
1190	\$NEW

*quantities limited

SEIKOSHA SBP-10

An 800 cps workhorse for your office environment. Standard features include a 64 k buffer, 18 pin printhead and 32 character LCD readout. Unprecedented high speed printing from Seikosha.

\$2995⁹⁵

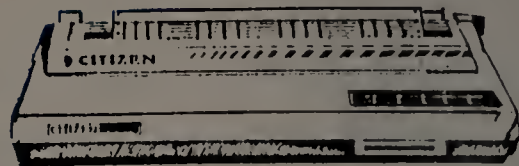


CITIZEN™

MSP-55

\$455⁹⁵

When convenience and ease of operation is required in a 15" carriage printer, you'll look twice at the Citizen MSP 55. Citizen has set standards with 300 cps (draft) and 50 cps (NLQ), quiet mode operation, exclusive push/pull tractor and convenient soft touch control panel. For world class performance in your office, select the Citizen MSP 55.



Diskettes

5-1/4

Disk Notcher	\$5.95
Maxell:	
SSDD	\$7.95
DSDD	\$8.95
Bonus:	
SSDD	\$5.95
DSDD	\$6.95
SKC:	
DSDD	\$6.95
DSHD	\$13.95

Xidex:	
DSDD	\$4.95
3.5	
Maxell:	
SSDD	\$11.50
DSDD	\$17.95
Bonus:	
SSDD	\$10.95
DSDD	\$13.95

Verbatim:	
SSDD	\$12.95
DSDD	\$18.95
Xidex:	
DSDD	\$12.95
SKC:	
SSDD	\$9.95
DSDD	\$13.99

Joysticks

Tac 3	\$9.95	Winner 909	\$24.95
Tac 2	\$10.95	Wico IBM/AP	\$29.95
Tac 5	\$12.95	Lipstic Plus	\$14.95
Tac 1 + IBM/AP	\$26.95	Kraft KC III Ap/PC	\$16.95
Slik Stick	\$6.95	Kraft PC Joystick	
Black Max	\$10.95	Card	\$27.95
Boss	\$11.99	Kraft Maze Master	\$8.95
3-Way	\$19.99	I Controller	\$13.95
Buthandle	\$16.75	Epyx 500 XJ	\$13.95

1-800-233-8760



Call Lyco

**Mark "Mac" Bowser,
Sales Manager**

I would personally like to thank all of our past customers for helping to make Lyco Computer one of the largest mail order companies and a leader in the industry. Also, I would like to extend my personal invitation to all computer enthusiasts who have not experienced the services that we provide. Please call our trained

sales staff at our toll free number to inquire about our diverse product line and weekly specials.

First and foremost our philosophy is to keep abreast of the changing market so that we can provide you with not only factory-fresh merchandise but also the newest models offered by the manufacturers at the absolute best possible prices. And we offer the widest selection of computer hardware, software and accessories.

Feel free to call Lyco if you want to know more about a particular item. I can't stress enough that our toll-free number is not just for orders. Many companies have a toll-free number for ordering, but if you just want to ask a question about a product, you have to make a toll call. Not at Lyco. Our trained sales staff is knowledgeable about all the products we stock and is happy to answer any questions you may have. We will do our best to make sure that the product you select will fit your application. We also have Saturday hours — one more reason to call us for all your computer needs.

Once you've placed your order with Lyco, we don't forget about you. Our friendly, professional customer service representatives will find answers to your questions about the status of an order, warranties, product availability, or prices.

Lyco Computer stocks a multimillion dollar inventory of factory-fresh merchandise. Chances are we have exactly what you want right in our warehouse. And that means you'll get it fast. In fact, orders are normally shipped within 24 hours. Free shipping on prepaid cash orders over \$50, and there is no deposit required on

C.O.D. orders. Air freight or UPS Blue/Red Label shipping is available, too. And all products carry the full manufacturers' warranties.

I can't see why anyone would shop anywhere else. Selection from our huge in-stock inventory, best price, service that can't be beat — we've got it all here at Lyco Computer.

TO ORDER, CALL TOLL-FREE: 1-800-233-8760
New PA Wats: 1-800-233-8760

Hours: Monday through Friday, 9:00 a.m. to 9:00 p.m.
Saturday, 10:00 a.m. to 6:00 p.m.

Customer Service: 717-494-1670

Hours: Monday through Friday, 9:00 a.m. to 5:00 p.m.
Fax: 717-494-1441

Or write: Lyco Computer, Inc.
P.O. Box 5088, Jersey Shore, PA 17740

PLEASE NOTE: • full manufacturers' warranties • no sales tax outside PA • prices show 4% cash discount; add 4% for credit cards • APO, FPO, international; add \$5 plus 3% for priority • 4-week clearance on non-certified checks • we check for credit card theft • sorry, compatibility not guaranteed • return authorization required • due to new product guarantee, return restrictions apply • price/availability subject to change • prepaid orders under \$50 in Continental US, add \$3.00. Not responsible for typographical errors.

Access:

Wild. Cl. Value Pack \$9.95
10th Frame \$27.95

Activision:

Beyond Zork \$27.95
GBA Basketball \$9.95
Last Ninja \$24.95
Might & Magic \$27.95

Broderbund:

Ancient Art of War \$26.95
Print Shop \$34.95
Print Shop Comp. \$29.95
Carmen San Diego
Europe \$27.95

Electronic Arts:

Yeager's AFT \$26.95
Weaver Baseball \$26.95
Hunt for Red October .. \$31.95
Pegasus \$26.95
Skyfox II \$18.95
Starflight \$31.95
Alternate Reality-City .. \$25.95

Epyx:

California Games \$22.95
L.A. Crackdown \$28.95
Home Video Producer . \$28.95
Print Magic \$32.95
Death Sword \$11.95
Impossible Mission 2 ... \$22.95
Str. Sport Baseball \$22.95
Spider Bot \$13.95

Firebird:

Jinxter \$22.95
Universal Military
Simulator \$28.95

Microleague:

Microleag. Baseball \$22.95
GM Disk \$16.95
Stat Disk \$13.95

Microprose:

Conflict Vietnam \$22.95
F-15 Strike Eagle \$22.95
Silent Service \$22.95
Gunship \$27.95
Pirates \$22.95

Mindscape:

Blockbuster \$20.95
Gauntlet \$22.95
Harrier Combat
Simulator \$20.95
Indoor Sports \$16.95
Paperboy \$22.95
Willow \$22.95
Uninvited \$22.95

Origin:

Ultima III \$23.95
Ultima IV \$34.95
Moebius \$34.95

Strategic Simulations:

Gettysburg \$35.95
Phantasie III \$25.95
Questron II \$25.95
Stellar Crusade \$31.95
Star Command \$31.95
Wargame Constr. \$23.95

Sublogic:

Flight Simulator \$34.95
Jet Simulator \$30.95
Western Europe
Scenery Disk \$14.95

Timeworks:

Wordwriter PC \$27.95
PC Quintet \$49.95
Partner PC \$22.95
Swiftcalc PC \$22.95

Unlson World:

Newsmaster II \$39.95
Print Master \$29.95
Art Gallery 1 or 2 \$14.95



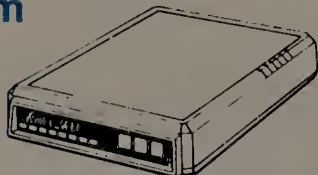
Order Now



Here's How



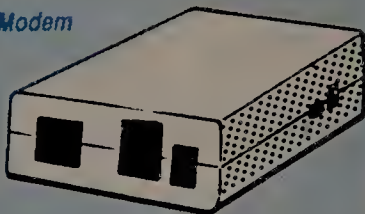
2400 Modem



- Auto/manual Originate or Answer
- Auto Speed Select in Originate/answer Modes
- RS-232C Interface
- 2-Year Warranty

\$149⁹⁵

1200P Avatex™ Pocket Modem



- Pocket Size
- Plugs Directly to RS 232C
- Battery Charger Included
- 12V DC Power Adapter

\$89⁹⁵



Attention Educational Institutions:

If you are not currently using our educational service program, please call our representatives for details.

MODEMS

Avatex

1200e	\$65.95
1200i PC Card	\$65.95
1200p	\$89.95
1200hc Modem	\$89.95
2400	\$149.95
2400i II PC Card	\$129.95

US Robotics

Courier 1200	\$169.95
Courier 2400	\$289.95
Sportsler 1200 PC	\$79.95
Courier 2400e	\$319.95
Courier 2400 PS	\$259.95
Courier 9600 MST	\$619.95

Hayes

Smartmodem 300	\$139.95
Smartmodem 1200	\$279.95
Smartmodem 2400	\$419.95
Smartmodem 1200B .	\$279.95
Smartmodem 2400B .	\$419.95

**DEALER
INQUIRIES
WELCOME,
CALL
TOLL FREE**

TOSHIBA

Universal Installation Kit Included

Floppy Disk Drives

5 1/4" 360 KB PC/XT Compatible ND-04D	\$ 79.95
3 1/2" 720 KB PC/AT Compatible ND-354A	\$89.95
3 1/2" 1.44 MB PC/AT Compatible ND-356T	\$104.95
5 1/4" 1.22 MB PC/AT Compatible ND-08DEG	\$94.95

Don't limit yourself. Buy top quality drives to suite your needs.

Toshiba 3.5 Floppy Drive

- IBM PC XT/AT Compatible
- 720 K
- 3.5" DSDD
- Universal Installation Kit Included
- Full Manufacturers Warranty

\$89⁹⁵

MONITORS

Magnavox

7BM-613	\$79.95
7BM-623	\$79.95
CM8702	\$179.95
8CM-515	\$259.95
9CM-053	\$349.95
9CM-082	\$429.95

NEC

Multisync GS	\$189.95
Multisync II	\$589.95
Multisync + ...	\$899.95
Multisync XL	\$2699.95

Seagate HARDWARE

5.25" Half Heights:

ST 225 20 meg 65 MSEC MFM .	\$219.95
ST 225N 20 meg SCSI	\$289.95
ST 238R 30 meg RLL	\$234.95
ST 251 40 meg 40 MSEC MFM .	\$339.95
ST 251 40 meg 28 MSEC MFM .	\$419.95
ST 250 RP 40 meg Paried	
Solution	\$299.95
ST 277R 65 meg 40 MSEC RLL .	\$389.95
ST 277N 64 meg SCSI	\$439.95

3.5":

ST 125 20 meg 40 MSEC MFM .	\$235.95
ST 125N 20 meg SCSI	\$299.95
ST 138R 30 meg RLL	\$249.95
ST 138N 30 meg SCSI	\$334.95
ST 157R 49 meg RLL	\$399.95
ST 157N 48 meg SCSI	\$445.95

5.25" Full Heights:

ST-4038 31 meg 40 MSEC MFM	\$459.95
ST-4053 40 meg 28 MSEC MFM	\$459.95
ST-4096 80 meg 28 MSEC MFM	\$575.95
ST-4144R 122 meg 28 MSEC RLL	\$679.95

Seagate Internal Cards

ST125 20 meg Internal Card ...	\$299.95
ST157R 49 meg Internal Card .	\$485.95

Controllers

MFM Controller (XT)	\$59.65
RLL Controller (XT)	\$64.95

Call for kit pricing and specials.

Ask about our

Seagate Paired Solutions!

PC's & ACCESSORIES

Laser Compact XTE 640 K	\$539.95
Laser Turbo XT Model II	\$629.95
Vendex VTI-33-XT	\$699.95
Vendex VTI-55-AT	\$1139.95*
Sharp PC 4502	\$1149.95
Sharp 4521	\$1949.95
Citizen Mate/12	\$1349.95
BCC CG ColorCard	\$94.95
ATI VIP	\$299.95

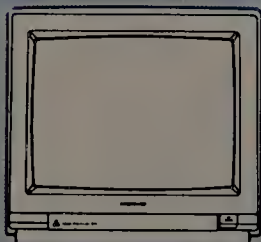
*w/o Monitor

NEC

MultiSync II

- Auto scanning monitor compatible with IBM, VGA, EGA + CGA video standards
- Up to 800 x 560 max resolution
- Includes 9-15 pin VGA & cable, self configuring 9-9 pin cable (CGA, EGA, or PGA)
- Tilt/swivel stand

\$589⁹⁵



OKIDATA

393: Lightning quick speed of 450 cps draft and 120 LQ Mode at your command. Add to this Okidata's paper park feature, push tractor and standard 30K buffer and you have a 24 pin printer capable of the most demanding office environment.



\$955⁹⁵

Price Guarantee: Since 1981, we have led the industry by continuing to offer the lowest national prices while providing quality service. Many companies have come and gone trying to imitate our quality and service. If by some oversight we do not have the lowest prices advertised on the products you desire, then we would appreciate the opportunity to rectify this oversight.

ESTABLISHED
1968

MONTGOMERY GRANT

PC WORLD
3/89

OUTSIDE USA CALL
(718)692-0071

For Customer Service
Call Mon-Fri: 9:30am-4:30pm
(718) 692-1148

Retail Outlet: Penn Station, Main Concourse
(Beneath Madison Square Garden) NYC, NY, 10001
Store Hours: Mon-Thurs, 8:30am-8pm/ Fri:8:30am-5pm/ Sat,-CLOSED /Sun:9:30am-7pm

FOR ORDERS & INFORMATION CALL TOLL FREE

1-800-759-6565

Monday-Thursday, 9:00am-7:00pm/Friday, 9:00am-5:00pm/Saturday CLOSED/ Sunday, 9:30am-6:00pm (EST)
NO SURCHARGE FOR CREDIT CARD ORDERS / WE INVITE CORPORATE AND EDUCATIONAL CUSTOMERS
CORPORATE LEASING AVAILABLE / DISCOUNTS FOR QUANTITY ORDERS

OR WRITE TO:
Montgomery-Grant Mail Order Dept
P.O. Box 58 Brooklyn N.Y. 11230

FAX NO. 7186923372
TELEX 422-132 MGRANT

LAPTOPS



**AMSTRAD
PPC-640 SD**
• 640K
• 720K Floppy Drive
• Built-in 2400 Baud Modem
\$769

AMSTRAD PPC-640 with Two Drives.....	\$849
TOSHIBA 1600.....	\$3269
TOSHIBA 3100 e.....	\$2799
NEC MULTISPEED EL II.....	\$1499
NEC MULTISPEED HD.....	\$2149
TOSHIBA 1000.....	\$749
TOSHIBA 1200 F.....	\$1399
TOSHIBA 1200 H.....	\$2199
TOSHIBA 1200 HB.....	\$2399
TOSHIBA 3200.....	\$3669
TOSHIBA 5100.....	\$4599
ZENITH 184 w/TWO FLOPPIES.....	\$1489
ZENITH 184-2 w/20MB.....	\$2199
ZENITH 184-98 w/20MB MODEM.....	\$2099
ZENITH 286 w/20MB.....	\$3299
ZENITH 286 w/40MB.....	\$3569
SPARK EL.....	\$999

MODEMS, EXTERNAL DRIVES & ACCESSORIES
AVAILABLE FOR ALL LAPTOPS



NEW

AMIGA 500 w/Built-In 5.25" Drive **\$519**

AMIGA 500 w/1084S Monitor **\$799**

AMIGA 2000 w/Built-In 3.5" Drive **\$1399**

AMIGA 1084S RGB MONITOR.....\$294.95
AMIGA 2088 BRIDGE CARD.....\$499.95
AMIGA 1010 DISK DRIVE.....\$189.95

AMIGA 2500.....CALL

ALL COMPUTERS AND PERIPHERALS
IN STOCK!!

**SEAGATE 20,30, 40, 60,
80MB HARD DRIVES IN
STOCK!**

PRINTERS

STAR	EPSON
NX-1000.....\$169.95	FX-1050.....\$489.95
NX-1000	FX-850.....\$339.95
RAINBOW.....\$219.95	LQ-500.....\$315.95
NX-2400.....\$304.95	LQ-850.....\$529.95
	LQ-950.....\$589.95
	LQ-1050.....\$729.95
	LQ-2550.....\$919.95
	LX-80.....\$199.95

TOSHIBA
321-SL.....\$449.95

NEC
P2200.....\$349.95
P5200.....\$499.95
P5300.....\$669.95

OKIDATA
OKI-120.....\$189.95
OKIMATE 20.....\$119.95
OKIDATA 180.....\$239.95

**DICONIX 150
PRINTER FOR
LAPTOPS.....\$299.95**

**CITIZEN PRINTERS
IN STOCK!**

PANASONIC
1080I-II.....\$159.95
1032L.....\$299.95
1091I-II.....\$189.95
KXP-1524.....\$499.95
KXP-1595.....\$409.95
KXP-1124.....\$319.00

**HEWLETT LASERJET SERIES II
PACKARD \$1629**

1 MB EXPANDER.....\$349
2MB EXPANDER FOR LASERJET II.....\$749
HP DESKJET PRINTER.....\$699
HP LASERJET IID.....\$2995



**EPSON EQUITY 1+
IBM XT COMPAT. PKG.**
• 640K RAM w/Clock Calendar
• 360K Drive
• Keyboard
• Serial and Parallel Ports
• 12" High Resolution Monitor
• MS DOS / GW Basic
\$799

SAME W/20MB HARD DRIVE.....	\$1059
SAME W/30MB HARD DRIVE.....	\$1099
SAME W/40MB HARD DRIVE.....	\$1199
SAME W/TWO 360K FLOPPIES.....	\$879



**EPSON EQUITY II+
IBM AT COMPATIBLE
HARD DRIVE PACKAGE**
• Keyboard
• 640K RAM
• 80286 Microprocessor
• 1.2MB Floppy Drive
• 20MB Hard Drive
• 12" Monitor
• MS DOS/GW Basic
\$1449

SAME W/30MB HARD DRIVE.....	\$1499
SAME W/40MB HARD DRIVE.....	\$1599
LOGITECH MOUSE M-7.....	\$59.95



**EPSON EQUITY III+
IBM AT COMPATIBLE
20MBHARD DRIVE PKG.**
• Keyboard
• 80286 Processor
• 640K RAM
• 6/8/12 MHz.
• 1.2 MB Floppy Drive
• 20MB Hard Drive
• 12" Monitor
• 8 Expansion Slots
• Serial & Parallel Ports
• MS DOS/GW Basic
\$1749

SAME W/30MB HARD DRIVE.....	\$1799
SAME W/40MB HARD DRIVE.....	\$1899

WE RECONFIGURE ANY OF OUR COMPUTER PKGS. TO FIT YOUR SPECIFICATIONS.
CALL FOR INFORMATION. WE CARRY MODEMS, DRIVES, CARDS COLOR MONITORS
& ALL OTHER ACCESSORIES FOR YOUR COMPUTER

**SHARP PC-7100A PORTABLE
IBM XT COMPATIBLE COMPUTER PKG.**

• Detachable Keyboard
• Backlit Screen
• 8 MHz. Turbospeed
• 5.5" Floppy Drive
• 20MB Hard Drive
• Serial/Parallel Ports



PC 7000A w/2 Floppies.....**\$1488**
\$788

LEADING EDGE

MODEL D3

• Keyboard
• 2MB RAM
• 1.2MB Floppy Drive
• 65MB Hard Drive
• 16MHz.
• 12" VGA Monitor with VGA Card
• MS DOS/OS2
\$3699



MODEL D

IBM XT COMPATIBLE PKG.
512K RAM Computer
Keyboard
360K Floppy Drive
4.77-7.16 MHz.
\$699



SAME W/TWO 360K FLOPPIES.....	\$769
SAME W/20MB HARD DRIVE.....	\$949
SAME W/30MB HARD DRIVE.....	\$999

COMPAQ

286 MODEL 1

IBM AT COMPAT. PKG.
• 640K • 1.2MB • Floppy Drive
• 7 Expansion Slots • 8/12 MHz.
• 12" Monitor • MS DOS/GW Basic
\$1799



commodore PC10-1

IBM XT COMPAT. PKG.

• 512K RAM
• 360K Floppy Drive
• 12" Monitor
• Serial & Parallel Ports
• Keyboard
• Box of 10 Diskettes
\$499



IBM XT

HARD DRIVE PKG.

• IBM XT Computer
• IBM Keyboard
• 256K RAM
• Expandable to 640K
• 360K Disk Drive
• 20MB Hard Drive
• Pkg. of 10 Diskettes (Monitor Optional)
\$1199



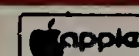
**IBM XT PACKAGE WITH
TWO FLOPPY DRIVES.....**

\$999

IBM AT

HARD DRIVE PKG

• 1.2MB Floppy Drive
• 20MB Hard Drive
• Serial/Parallel Ports
• Keyboard
(Monitor Optional)
\$1799



PACKAGES

**APPLE IIC+ w/Floppy
Drive & 12" Monitor
\$599**

**APPLE IIE w/5.25 Disk
Drive and 12" Monitor
\$749**

APPLE IIGS COMPUTER PACKAGE

• Apple IIGS Computer
• 512K Upgrade
• RGB Color Monitor
• Apple 3.5" Disk Drive
\$1499



IMAGEWRITER II PRINTER.....\$449

MAC SE COMPUTER W/DUAL DRIVE.....\$2299

MAC SE COMPUTER W/20MB

APPLE HARD DRIVE.....\$2749

APPLE MAC II.....\$3499

APPLE MAC II W/40MB.....\$4299

SANYO



**PR-3000A
DAISY WHEEL LETTER
QUALITY PRINTER
\$59.95**

**commodore
COLT**



IBM XT COMPATIBLE
PACKAGE
• Keyboard
• Two 360K Floppies
• Serial & Parallel Ports
• 12" Monitor
• MS DOS/GW Basic
\$699

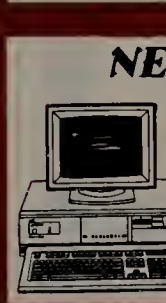
commodore

128D PACKAGE

• Commodore 128D Computer w/Built-in Disk Drive
• Commodore 1902 Color RGB Monitor
• Commodore Color Printer
\$699

64/C PACKAGE

• Commodore 64/C Computer
• Commodore 1541C Disk Drive
• Commodore Color Printer
• 12" Computer Monitor
\$389



NEC

POWERMATE 1

HARD DRIVE PKG.

• 640K
• Keyboard
• 10 MHz.
• 1.2MB Floppy Drive
• 20MB Hard Drive
• Serial/Parallel Ports
• 18" Monitor
\$1599



AST

MODEL 80

HARD DRIVE PKG.

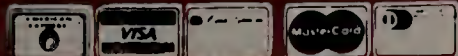
• 80286 Processor
• Keyboard
• 1.2MB Floppy Drive
• 20MB Hard Drive
• 12" Monitor
• MS DOS/GW Basic
\$1599



SAME PACKAGE W/30MB.....	\$1649
SAME PACKAGE W/40MB.....	\$1749

MONITOR SPECIALS

MAGNAVOX EGA MONITOR.....	\$339
MAGNAVOX EGA MONITOR W/EGA CARD.....	\$459
MAGNAVOX VGA MONITOR.....	\$369
MAGNAVOX VGA MONITOR W/VGA CARD.....	\$569
NEC MULTISYNC II.....	\$579



RUSH SERVICE AVAILABLE. CALL FOR DETAILS.

Certified Check, Bank Check, Approved P.O.s, Money Orders, Visa, Am Ex, Diner's Club, Carte Blanche, & C.O.D.s accepted. No additional surcharge for Credit Card orders. Non-certified checks must wait 4-6 weeks for clearance. N.Y. residents add applicable sales tax. Prices and availability subject to change without notice. Not responsible for typographical errors. Return of defective merchandise must have prior return authorization number or returns will not be accepted. IBM PC XT are registered trademarks of International Business Machine Corp. APO FPO orders please add 15% shipping and handling. All APO FPO orders are shipped first class priority air. All orders can be shipped Air Express. Call for details DCA #00233

Arlington Computer Products gives you the best prices on IBM PCs...and Compaq too!

IBM PERSONAL SYSTEM II

Model 30, 20 MB, w/Monitor	\$1899
Model 50Z, 30 MB, w/Monitor	\$2999
Model 60, w/44 MB and Monitor	\$3495
Model 60, w/70 MB and Monitor	\$3895
Model 70, w/60 MB and Monitor	\$4395
Model 70, w/121 MB and Monitor	\$5749
Model 80, w/44 MB and Monitor	\$4595
Model 80, w/70 MB and Monitor	\$5195
w/Color Monitor add \$250	

IBM XT & AT *Call for Custom Configurations*

COMPAQ 286

DESKTOP — (12 MHZ)
1 Drive 640K, 40 MB,
Mono Monitor **\$2295**

COMPAQ PORTABLES

386 Model 40	\$5649
386 Model 100	\$6995
SLT 20	\$3975
SLT 40	\$4499
Portable III 20 MB	\$3599
w/40 MB	\$4175

COMPAQ 386

Model 386S w/40 MB (16 MHZ)	\$3695
Model 386E MB (20 MHZ)	\$3749
Model 386E w/40 MB (20 MHZ)	\$4695
Model 386E w/110 MB (20 MHZ)	\$5695
Model w/110 MB-25 MHZ	\$7199
Model w/300 MB-25 MHZ	\$9099

COMPAQ DESK PRO

1 Drive, 640K, 20 MB	
Green or Amber Monitor	\$1695

AST PREMIUM

286

10 MHZ, 512K, 1 floppy, 40 MB,
serial and parallel ports, mono
monitor.

\$2049

386

20 MHZ, 1 MG, 1.2 floppy, 40 MB,
mono monitor.

\$3299

PRINTERS

EPSON

LX 800	\$179	LQ 500	\$299
DFX 5000 .	\$1349	LQ 850	\$519
FX 850	\$339	LQ 1050 ...	\$719
FX 1050 ...	\$439	LQ 950	\$579
EX 800	\$399	LQ 2550 ...	\$909

OKIDATA

ML 320	\$339	ML 321	\$469
ML 390	\$469	ML 391	\$639
393.....	\$999		

TOSHIBA

321 S/L / 341 S/L	\$459/\$589
351 SX	\$885

NEC

P5200	\$539	P5300	\$699
P2200	\$349	P9XL	\$1049

IBM

Quietwriter III	\$1199
Proprinter II	\$389
Proprinter X24	\$549
Proprinter XL III	\$599
Proprinter XL24	\$719

HEWLETT-PACKARD

Laserjet II	\$1699
Laserjet IID	\$3149
1 MG Upgrade	\$309
2 MG Upgrade	\$589
4 MG Upgrade	\$1199
25 in 1 Font	\$265

MULTIFUNCTION BOARDS

DFI w/384K	\$199
AST 6 Pack w/384K.....	\$229
AST Rampage AT w/512K	\$389
AST Hot Shot	\$355
Orchid Tiny Turbo	\$279
Orchid Twin Turbo	\$399
Intel Above Board 286	\$369
Irma Board	\$695
AST 5251-11	\$529
AST 5251-11 Plus Enhanced ...	\$589

CHIPS

64K Ram Chips	9 for \$25
256K Chips	each \$11
Compaq 386 1 MB	\$549
Compaq 386 4 MB	\$1995
8087-3/-2	\$109/\$149
80287-6MHZ	\$159
80287-8MHZ	\$229
80287-10MHZ	\$259
80387-16	\$399
80387-20	\$499
80387-25	\$659

SOFTWARE

D Base III Plus	\$399
D Base IV	\$459
Framework	\$399
IBM Displaywrite IV	\$299
Logitech Mouse	\$74
Lotus 123	\$299
Managing Your Money	\$125
Microsoft Mouse	\$109
Microsoft Word	\$219
Mouse Systems Mouse	\$99
Multimate Adv. II	\$259
R Base for DOS	\$439
Symphony	\$429
Ventura Desktop Publ.	\$499
Word Perfect 5.0	\$219

MODEMS & FAXES

Hayes 1200/2400	\$289/\$419
Everex 1200/2400	\$79/\$149
Everex 2400 External	\$219
US Robotics 2400 Int.	\$169
Sharp FO-300 Fax	\$1219
Sharp FO-420 Fax	\$1299

DRIVES & TAPES

Ext. 5 1/4" for PSII ..	\$219	SEAGATE HARD DISKS	
Ext. 1.2 for PSII ...	\$219	20 MB for XT (ST225) .	\$269
Toshiba 3 1/2" 720K .	\$99	30 MB for XT (ST238) .	\$289
Toshiba 3 1/2" 1.44 .	\$105	40 MB for AT (ST251) .	\$349
20 MB Tape	\$339	40 MB for AT (ST251-1)	\$419
40 MB Tape	\$459	80 MB for AT	\$599

IOMEGA

Bernoulli Box II 5 1/4" 20 MB Int. w/card	\$969
Dual 20 Ext. w/card	\$1769
Bernoulli Plus	\$3450

PLUS

Hard Card 20 MB ..	\$529	Hard Card 40 MB ..	\$649
--------------------	-------	--------------------	-------

VIDEO BOARDS

ATI EGA Wonder 480	\$259
ATI VIP VGA	\$269
Compaq VGA	\$449
Everex EGA Autoswitch ..	\$159
Everex VGA	\$239
Hercules Graphics Plus ..	\$179
NEC MVA 1024	\$799
Orchid VGA	\$289
Paradise Autoswitch 480 .	\$179
Paradise VGA	\$269
Paradise Professional	\$469
Vega VRAM VGA	\$499
Vega VGA	\$269

MONITORS

NEC

Multisync	\$579
Multisync Plus	\$889
Multisync XL, 19"	\$2075

MITSUBISHI

EGA	\$399
Diamond Scan	\$499

PRINCETON

HX12E ...	\$449	Ultrasync	\$499
-----------	-------	-----------	-------

SAMSUNG

Color/EGA	\$229/\$339
Multisync	\$439

**Arlington
Computer
Products, inc.**



3025-E S. MALMO
ARLINGTON HEIGHTS, IL 60005

FOR ORDERS & SYSTEMS QUOTES: **800-548-5105**

CUSTOMER SERVICE AND IN ILLINOIS **312-228-6333**

SHIPPING **312-228-6333**

TECHNICAL ASSISTANCE **312-228-1470**

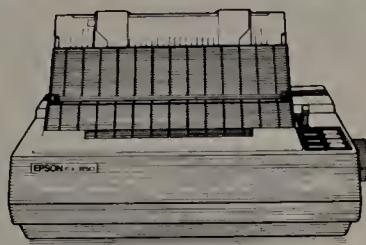
FAX **312-228-0516**

Prices and Availability Subject To Change Without Notice

America's choice and **Arlington Computer Products** choice is **EPSON®**

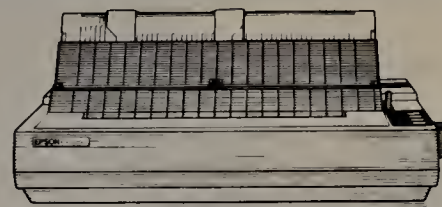
It's not hard to understand why. Care in design, engineering and manufacturing have made Epson an industry leader and the industry standard. And to back their reputation, a one year warranty stands behind every Epson product.

Arlington Computer Products is an authorized Epson® dealer. Please call for immediate delivery at very competitive prices.



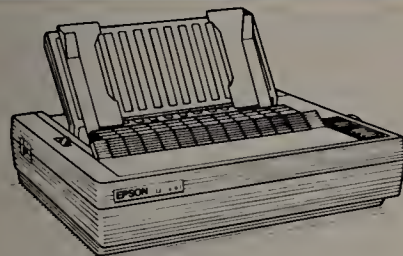
Epson FX-850

- Narrow-carriage 9-pin, dot-matrix printer.
- SmartPark™, a unique Epson paper-handling innovation, lets you switch from fanfold to single sheets or envelopes without removing hardware or paper.
- With a standard push feed tractor and single sheet friction feed, the FX-850 can handle virtually any type of paper as well as envelopes.
- Exclusive SelecType front control panel puts popular printer features and SmartPark operations at your fingertips.
- The FX-850 prints 264 characters per second (CPS) in high-speed draft mode (12 CPI); 54 CPS in Near Letter Quality mode (12 CPI).



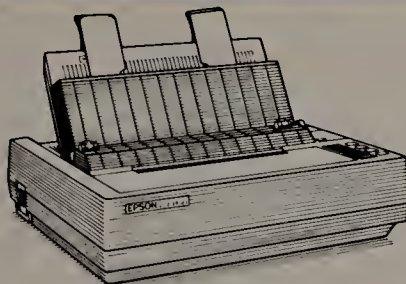
Epson FX-1050

- Wide-carriage 9-pin, dot-matrix printer.
- SmartPark™, a unique Epson paper-handling innovation, lets you switch from fanfold to single sheets or envelopes without removing hardware or paper.
- With a standard push feed tractor and single sheet friction feed, the FX-1050 can handle virtually any type of paper as well as envelopes.
- Exclusive SelecType front control panel puts popular printer features and SmartPark operations at your fingertips.
- The FX-1050 prints 264 characters per second (CPS) in high-speed draft mode (12 CPI); 54 CPS in Near Letter Quality mode (12 CPI).



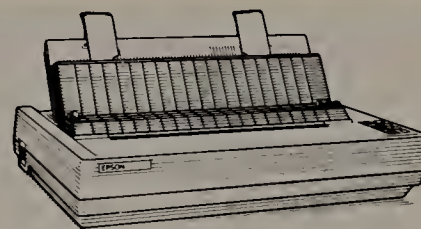
Epson LQ-500

- Epson's 24-pin, dot-matrix technology creates true letter quality characters and high-resolution graphics
- Prints 180 characters per second (CPS) in draft mode; 60 CPS in letter quality (12 CPI)
- Automatic single sheet loading, standard pull tractor and friction feed for versatile paper handling
- Exclusive SelecType front control panel offers quick, easy selection of popular types, fonts and pitch
- Two resident, letter quality fonts — Roman and Sans Serif
- New "shadow" and "outline" print modes for use with desktop publishing applications



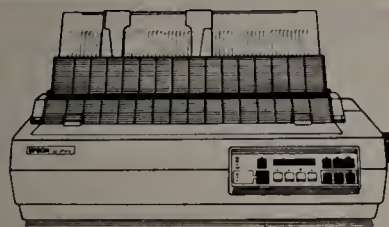
Epson LQ-850

- Epson's 24-pin, dot-matrix technology creates true letter quality characters
- Epson's SmartPark™
- Exclusive SelecType front control panel offers quick, easy selection of popular types, fonts and pitch
- 264 Characters per second in the high-speed draft mode delivers outstanding productivity
- 88 Characters per second in Letter Quality mode for enhanced, high-resolution characters
- In draft mode or Letter Quality mode, the LQ-850 runs at a surprisingly quiet 55 dB noise level



Epson LQ-1050

- Epson's 24-pin, dot-matrix technology creates true letter quality characters
- Epson's SmartPark™
- 264 Characters per second in the high-speed draft mode delivers outstanding productivity
- 88 Characters per second in Letter Quality mode for enhanced, high-resolution characters
- In draft mode or letter quality mode, the LQ-1050 runs at a surprisingly quiet 55 dB noise level
- Exclusive SelecType front control panel offers quick, easy selection of popular types, fonts and pitch



Epson LQ-2550

- 24-Pin technology creates superior Letter Quality characters and high-resolution graphics up to 360 dpi.

- 7-Color printing capability is standard.
- Epson's SmartPark™
- Exclusive LCD SelecType front control panel for easy selection of pre-sets, fonts and printer functions.
- 133 Characters per second print speed in Letter Quality mode (12 CPI).
- 400 Characters per second print speed in draft mode (12 CPI).
- Epson LQ ESC/P™ assures software compatibility.

EPSON®

**WHEN YOU'VE GOT AN EPSON,
YOU'VE GOT A LOT OF COMPANY.™**

Epson is a registered trademark of Seiko

**Arlington
Computer
Products, inc.**



3025-E S. MALMO
ARLINGTON HEIGHTS, IL 60005

Call: **800-548-5105**

In Illinois 1-312-228-6333

Fax: 312-228-0516

Don't Just Buy a Computer Invest in a SF-286



SF-286 (Hard Drives Optional)	8MHz	10MHz	10MHz (0 WS)	12MHz (0 WS)	16MHz (386)
Mono System	\$995	\$1119	\$1345	\$1400	\$2000
EGA System	\$1369	\$1545	\$1720	\$1770	\$2349
Super VGA System	\$1599	\$1699	\$1829	\$1959	\$2559

Basic System Features:

80286-16 bit CPU, 80287 socket, 512K RAM expandable to 1MB, AMI BIOS, 1.2MB floppy, floppy/hard disk controller, Keytronics 101 keyboard, clock/calendar with battery backup, 195 watt power supply, 48 hour burn-in, operations manual, one year limited warranty and optional on-site maintenance agreement.

SF-286-8 MHz

20MB Mono Special \$1199

Basic System features plus: Monographics board with printer port, Samsung 12" mono monitor and Seagate 20MB hard drive.

SF-286-8 MHz

20MB EGA Special \$1569

Basic System features plus: EGA Bundle and Seagate 20MB hard drive.

SF-286-8 MHz

20MB VGA Special \$1799

Basic System features plus: Super VGA Bundle, and Seagate 20MB hard drive.

SF-286-12MHz

20MB EGA Special \$1929

Basic System features plus: EGA Bundle, 1MB RAM and Seagate 20MB hard drive. Upgrade to Seagate 40MB hard drive, Add\$18
Upgrade to Seagate 80MB hard drive, Add\$400

SF-80386-16 MHz

20MB EGA Special \$2529

Basic System features plus: EGA Bundle, 1MB RAM and Seagate 20MB hard drive.

EGA Bundle \$479

Everex EGA autoswitch graphics board (640x350) and Evervision EGA color monitor.

Super EGA Bundle \$579

Everex EGA Deluxe autoswitch graphics board (640x480, 752x410) and Evervision multisync color monitor with tilt/swivel. Add \$80 to upgrade to Mitsubishi Diamond Scan monitor.

Super VGA Bundle \$699

MaxLogic VGA graphics board (640x480, 800x600, up to 256 colors) and Evervision multisync color monitor with tilt/swivel. Add \$80 to upgrade to Mitsubishi Diamond Scan monitor.

Everex Modems

Internal 1200B + Bitcom software ..\$80
External 1200B Pocket + Bitcom ...\$139
Internal 2400B + Bitcom software ..\$149
External 2400B + Bitcom software ..\$199

Hard Disk Specials (for PC)

Seagate ST225 20MB + Cont.\$265
Seagate ST238 30MB + Cont.\$289
Seagate ST251 40MB + Cont.\$449

Hard Disk Special (for AT)

Seagate ST125 20MB (40ms)\$269
Seagate ST138 30MB (40ms)\$339
Seagate ST251 40MB (40ms)\$369
Seagate ST251-1 40MB (28ms)\$429
Seagate 4096 80MB (28ms)\$649

Desktop Laser Printer ...\$1399

- HP II, Diablo 630, Epson FX-80 and IBM Proprinter XL emulation
- Prints at 6 pages per minute
- 300 x 300 dpi resolution
- 512K standard memory, upgradable to 1MB, 2MB or 4MB
- Six resident fonts
- 132 HP compatible Bitstream softfonts included

Misc. Specials

Mini I/O (PAR, SER, CLK, CAL)\$55
Mini I/O with Game Port\$65
Logitech C7 serial mouse\$79
TEAC 3.5" 720K floppy drive\$99
TEAC 3.5" 1.44MB floppy drive\$129
150 Watt Power Supply\$55
MaxLogic Monographics with printer \$79
MaxLogic VGA graphics board\$249
3MB EMS memory with OK (AT) ...\$99
Everex Tape Backups from\$549

Seagate, Samsung, Everex, Evervision, Mitsubishi, IBM, Bitcom, Logitech, MaxLogic, TEAC, and HP are the trademarks or registered trademarks of their respective companies.
SFMicro6 v.1 1/12/89

SFmicro

1825 Lombard Street
San Francisco, CA 94123

California Orders, Information
(415) 929-1505

National Order Desk (800) 237-5631
Technical Support (415) 929-1607

Hours: M-F, 9 to 5 (PST)

University P.O.'s and Dealer
Inquiries are Welcome

TERMS: We accept MasterCard, VISA (no surcharge), American Express, COD's (Certified Funds) and approved company P.O.'s. California residents please add sales tax. 10% fee for unauthorized returns (call for RMA number). Returns must be shipped freight prepaid by customer. Prices are subject to change without notice. We reserve the right to substitute equivalent items. We are not responsible for typographical errors.

THE \$29 MONEY MANAGEMENT SOLUTION.

"An exceptional value."
Tom Badgett, PC Clones

MONEYCOUNTS[®] 5.0

The Highly Accurate
Accounting Money
Program For IBM or
Compatible Computers

"I was impressed.
It wins the cost-effective award."

John Dvorak, PC Magazine

"This is a great program: logical, easy
to learn, and fast and easy to use."
Lloyd Edwards, Palmetto PC Chronicles

MONEYCOUNTS[®]
Version 5.0

"This program has all the features
and capabilities of money management
programs costing 10 times as much."

Leonard Hyre, PCM Magazine

GUARANTEED.

At a time when the ideal money management/
accounting program that offers outstanding value, we
want you to examine the evidence on MONEYCOUNTS.
It's the **best choice for home and business.**

Designed by a CPA designed, easy to use, menu-driven
program with on-line help, and requires no accounting experi-
ence. You'll appreciate the ease with which MONEY-
COUNTS 5.0. . . .

- Manages your cash, checking, savings, & credit cards
- Prepares your budget
- Balances your checkbook
- Prints 5 types of financial statements (including net worth)
- Prints 6 types of inquiry reports
- Prints any type of pin-feed check & updates your records automatically
- Prints general ledger & accountant's trial balance
- Handles up to 999 accounts & 100,000 transactions a year with its fast financial data base
- Estimates your personal income tax
- Analyzes financing options & savings programs — computes interest rates & loan payments — prints amortization and accumulation schedules
- Manages mail lists — zip and alpha sorts — prints labels and index cards
- Displays and prints three-dimensional graphics — works with monochrome or color monitors
- Provides password protection, fiscal year support, pop-up notepad, and much more!

Hard to believe the low price? Don't worry! There's no catch. MONEYCOUNTS has a proven track record, has been on the market over four years, and is continuously receiving rave reviews. **If you're not 100% satisfied, return MONEYCOUNTS within 30 days for a full refund** (excluding shipping). Over 50,000 users have decided in favor of MONEYCOUNTS! Order today and judge for yourself!

For Same Day Shipping

VISA, MASTERCARD & C.O.D. ORDERS CALL

1-800-223-6925

(In Canada, call 319/395-7300)
Weekdays 8:30 a.m. to 9:00 p.m. CST
Saturdays 9:00 a.m. to 5:00 p.m.
Or send check or money order payable to Parsons Technology.



375 Collins Road N.E.
Cedar Rapids, Iowa 52402

Circle 130 on reader service card



Dept. W
375 Collins Road NE
Cedar Rapids, Iowa 52402

MONEYCOUNTS[®]
Version 5.0
\$29 + \$5 shipping

NOT COPY PROTECTED
INCLUDES PRINTED MANUAL

NAME _____

ADDRESS _____

CITY _____

STATE/ZIP _____ PHONE _____

CHECK ☐ MONEY ORDER ☐ VISA ☐ MASTERCARD ☐

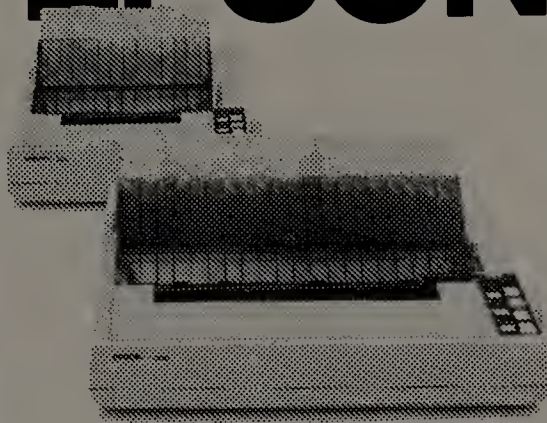
CARD # _____ EXP. DATE _____

MONEYCOUNTS 5.0 requires an IBM or compatible computer, 256K or more RAM, DOS 2.0 or higher, 2 disk drives (or a hard disk). Add \$5 shipping/handling — \$10 outside North America. Iowa residents, please add 4% sales tax.

DON'T LET HIGH PRICES FREEZE

YOU!

EPSON®



FX-850 & FX-1050

Epson's FX printers are legendary in the computer products industry. The FX-850 and FX-1050 continue Epson's long tradition of quality, performance and reliability. Now with increased speed and advanced features, the legend grows stronger.

Paper-Handling Performance.

The narrow-carriage FX-850 and wide-carriage FX-1050 are equipped with Epson's SmartPark™ feature that lets you switch paper types without removing hardware or paper.

Built-In Convenience. Epson's Selectype front control panel puts popular printer features at your fingertips.

High-Speed Productivity. Both print 264 characters per second (CPS) in draft mode; 54 CPS in Near Letter Quality.

Backed by the Leader. Like all Epson computer products, the FX-850 & FX-1050 printers are supported by a nationwide service network and backed by Epson's one year limited warranty.

EPSON®

WHEN YOU'VE GOT AN EPSON,
YOU'VE GOT A LOT OF COMPANY.™

Epson is a registered trademark of Seiko Epson Corporation.
SmartPark is a trademark of Epson America, Inc.

WARM UP TO BULLDOG AND EPSON!



BULLDOG

COMPUTER PRODUCTS



For more information, call 1-800-438-5009 or visit our website at www.epson.com

COMPATIBLE

88 MHZ TURBO

1 floppy, 640K, AT style keyboard, monographics card, mono monitor\$725

Color System add \$150 w/20 mb add \$269, w/30 mb add \$289

90 day warranty through Bulldog

286 Bulldog 10 MHZ

1 mb Ram, 1.2 floppy\$1095

Bulldog 386 16 mhz, 1 mb

Ram, 1.2 floppy\$1795

AST

AST Premium 286 Model 80, 10 mhz, 0 wait state, 512K, DOS keyboard, 1.2 floppy\$1495

AST Premium 386 Model 300 20 mhz, 1.2 floppy, 1 mg, DOS, keyboard\$2875

All AST computers carry a 1 year warranty

LAPTOPS

Epson Laptops!!.....CALL

NEC Multispeed EL.....\$1549

NEC Multispeed HD.....\$2299

Toshiba 1000.....\$825

Toshiba 1200.....\$2299

Toshiba 1200F.....\$1395

Toshiba 3100.....\$3095

T3200/T5100.....\$3745/\$4795

Zenith Super Sport 20 mb.....\$2325

Zenith Super Sport 286 20 mb.....\$3399

DRIVES

Seagate 20 dmb w/contr.

ST225.....\$259

Seagate 30 mjb w/contr.

ST238.....\$279

Seagate 40 mb for AT

ST251-1.....\$409

Seagate 40 mb for AT

ST251.....\$349

Seagate 80 mb ST4096.....\$575

CMS 5 1/4" ext. 360K for PS/2.....\$215

CMS 5 1/4" ext. 1.2 mb for PS2.....\$239

Pacific Rim 5 1/4" ext. 360K

for PS/2.....\$179

Pacific Rim 5 1/4" ext. 1.2

for PS2.....\$199

Toshiba 3 1/2" 720K int.....\$89

Toshiba 3 1/2" 1.44 mb int.....\$105

Toshiba 5 1/4" 360K int.....\$85

Toshiba 5 1/4" 1.2 mb int.....\$99

Bernouli Box II 5 1/4"

20 mb int.....\$955

20 mb ext. w/card.....\$1195

dual 20 mb ext w/card.....\$1769

Plus Hard Card 40.....\$669

Plus Hard Card 20.....\$525

Priam 60 mb AT.....\$629

Priam 43 mb AT.....\$469

MICE & MISC

Microsoft Mouse w/windows.....\$135

Microsoft Mouse w/PC

paint brush.....\$99

Mousesystems Mouse.....\$89

Logitech Mouse C7 Plus/Hi Res.....\$69/89

Logitech Scan Man.....\$199

COMPAQ

386 Desk Pro 40/60/130

\$3950/4895/6289

286 Desk Pro 12 mhz.....\$1695

Compaq II Model IV.....\$2879

Compaq Port. 386

Model 40/100.....\$5649/7199

Compaq III 20 mb/40mb

\$3595/4150

Compaq 386-S model

1/20/40.....\$2925/3465/3695

Compaq 386-25 110/300

\$7195/9395

Compaq SLT w/20 meg.....\$4395

90 day warranty through Bulldog

IBM

PERSONAL SYSTEM/2

Model 30 w/2 floppy.....\$1310

Model 30 w/1 floppy & 20 mg

\$1725

Model 50 - 20/30.....\$2550/2750

Model 60 - 40/70.....\$3295/3650

Model 70 - 60.....\$4325

Model 80 - 40.....\$4270

Model 80 - 70.....\$4875

Model 80 - 115.....\$6195

90 day warranty through Bulldog

INTEL PROCESSORS

80387-25.....\$799

80387-20.....\$499

80387-16.....\$399

80287-8.....\$229

80287-10.....\$269

8087-3/8087-2.....\$104/149

256K Chips/64K Chips.....Call

MONITORS

NEC

NEC Multisync II.....\$589

NEC Multisync Plus.....\$879

NEC Multisync GS.....\$239

NEC Multisync XL 19".....\$2199

IBM

Mono 8503.....\$209

Color Display 8512.....\$459

Color Display 8513.....\$559

Color 8514.....\$1195

PRINCETON

MAX12.....\$149

HX12.....\$419

HX12E.....\$449

Ultrasync.....\$529

MAGNAVOX

Amber 776.....\$74

RGB80 8762.....\$259

EGA 9CM053.....\$369

AMDEK 410.....\$145

PRINTERS

EPSON

LX 800 180 CPS, 30 NLQ.....\$179

LX 850 264 CPS, 54 NLQ.....\$339

FX 1050 264 CPS, 54 NLQ.....\$429

LQ 500 180 CPS, 60 NLQ.....\$299

LQ 850 330 CPS, 88 NLQ.....\$519

LQ 950.....\$589

LQ 1050 330 CPS, 88 NLQ.....\$719

LQ 2550 400 CPS, 108 NLQ.....\$929

OKIDATA

182 Plus 180 CPS, 30 NLQ.....\$229

320/321 300 CPS, 62 NLQ

\$339/465

390 24 pin 270 CPS, 90 NLQ.....\$465

391 24 pin 270 CPS, 90 NLQ.....\$639

292 240 CPS, 100 NLQ.....\$439

293 Plus 240 CPS, 100 NLQ.....\$575

393 450 CPS, 120 NLQ.....\$995

TOSHIBA

321 SL 216 CPS, 72 NLQ.....\$469

351 SX 350 CPS, 100 NLQ.....\$885

341 SL 216 CPS, 72 NLQ.....\$589

NEC

2200.....\$349

5200.....\$519

5300.....\$669

PANASONIC

1124.....\$339

1080i Model II.....\$189

1091/1092 Model II.....\$199/339

1524.....\$565

1592/1595.....\$415/459

3131/3151.....\$285/459

HEWLETT-PACKARD

Laser Series II.....\$1695

Desk Jet.....\$749

Pacific Data 1 mg/2 mg.....\$309/615

Pacific Data 25-N-1.....\$269

IBM

Proprinter II.....\$369

Proprinter X24.....\$559

Proprinter XL.....\$559

Proprinter XL 24.....\$725

Proprinter III.....\$495

Proprinter III XL.....\$589

6 foot parallel cable.....\$19

GRAPHICS CARDS

Everex Micro Enhancer.....\$149

Genoa Super Hi Res.....\$199

Genoa VGA 5100/5200.....\$239/359

Hercules Graphics.....\$181

Hercules in Color.....\$219

Orchid 800 VGA.....\$229

Orchid Pro Designer w/256K.....\$279

Orchid Pro Designer + w/512K.....\$399

Paradise Auto Switch 480.....\$179

Paradise VGA Plus.....\$265

Paradise VGA Professional.....\$479

STB Chauffeur HT.....\$135

STB Multi Res. II.....\$169

Vega Deluxe.....\$189

Vega VGA.....\$265

Vega Fastwrite.....\$339

Vega V Ram.....\$495

SOFTWARE

Aldus Pagemaker 3.0.....\$529

Chartmaster.....\$205

Clipper.....\$419

D Base IV.....\$469

DBXL.....\$125

Enable 2.0 w/Perspective.....\$379

Fastback Plus.....\$105

Foxbase +.....\$189

Freelance Plus.....\$299

Framework III.....\$439

Harvard Graphics.....\$265

IBM Display Write IV.....\$289

Lotus.....\$289

Microsoft Word 4.0.....\$209

Microsoft Excel.....\$279

Multimate Advantage II.....\$269

Peachtree li Complete.....\$149

PFS Prof Write.....\$119

PFS Prof File.....\$169

Paradox.....\$369

R Base for DOS.....\$439

Revelation.....\$469

Super Calc IV 1.0.....\$285

Symphony 1.2.....\$419

Ventura Desktop Publ.....\$489

Word Perfect 5.0.....\$219

Wordstar 2000 + 3.0.....\$239

Wordstar Pro 5.0.....\$239

TAPE DRIVES

Everex 60 m.b.....\$550

Archives 40 mb int.....\$299

CMS 150 mb-internal.....\$785

external.....\$825

Maynstream 60 PS/2 w/card

for model 50, 60 & 80.....\$869

MULTIFUNCT. BOARDS

AST Advantage w/128K.....\$229

AST Advantage Premium

w/512K.....\$309

AST 6 Pack Plus w/384K.....\$245

AST 5251-11 + Enhanced.....\$559

AST Rampage 286.....\$385

AST Rampage 286-2 for

Model 50/60.....\$549

AST Hotshot.....\$355

Everex Mini Magic w/o K.....\$59

Fast 88/V20 w/Switch.....\$89

Intel Above Board + w/512K.....\$399

Intel Above Board PS + w/512K.....\$449

Intel Inboard 386 w/adaptor.....\$1075

Intel Inboard 386 for PC w/1 mb.....\$799

Intel Above Board II for

PS/2 w/o K.....\$259

Irma Board II.....\$685

Logical Connection 256/512K

\$429/499

Orchid Ramquest Extra w/o K.....\$279

Orchid Ramquest XT/AT w/o K.....\$225

Orchid Tiny Turbo 286.....\$259

Orchid Ramquest II Z w/o K.....\$169

Orchid Twin Turbo.....\$349

MODEMS

Everex 1200 int/ext.....\$79/115

Everex 2400 int/ext.....\$139/169

Hayes 1200/2400.....\$279/419

Migent Pocket Modem.....\$89

Practical Peripherals half card

2400 w/Procomm.....\$159

US Robotics 2400/9600.....\$139/619

Supra Modem 2400 ext.....\$135

Ventel Half Card 2400

COMPUTER DIRECT

Since 1979

WE WON'T BE UNDERSOLD!*

Prices Expire 3-31-89

KALOK

3 1/2" 20 MEG Harddrive

- 26 Major Components
- Full ST-412 Interface Compatibility
- Open Loop Stepper Motor
- List \$399

\$249⁹⁵

Seagate

20 MEG Harddrive

- 20 Mega Byte Storage
- Floppy Disk Controller Included
- Fits IBM® PC, XT® & Compatibles
- List Price \$429

\$249⁹⁵

Seagate 40 MEG Harddrive

- 38 ms Access
- 40 Mega Byte Storage
- Half Height Construction
- List \$699

\$339⁹⁵

Seagate 80 MEG Harddrive

- 28 ms Average access time
- 80.2 Megabytes per drive
- 5 Discs
- List \$799

\$599⁹⁵

720 CPS 15" Printer

Multi-Head Wide Carriage Printer
With High Dot Resolution



- 720 CPS - 150 CPS NLQ
- 8K Print Buffer
- Print Speed of 214 LPM In Draft
- 6 Print Heads Achieve High Dot Resolution In Higher Speed
- NLQ Speed Of 47.4 LPM
- 136 Column Wide Carriage
- IBM® and Epson® Mode
- Parallel Centronics Port

Our Low Sale Price

\$699⁹⁵

List \$1995

FREE CATALOG!



Call For Your Free Catalog With Everything You Need For IBM®

IMTEC 14" Multiscan Monitor

IBM® CGA, EGA, VGA, and PGA
Compatibles



- Tilt and Swivel Base
- 14" non-glare screen
- 256 PGA colors
- 720 Dots Horizontal
- 480 Dots Vertical
- One-year Warranty
- IBM PC XT® and AT® compatability

Our Low Sale Price

\$399⁹⁵

List \$599

PC, XT® & AT® Compatible Internal Disk Drives

TEAC 360K - 5 1/4" Drive

- Double Sided/Double Density
- Fits IBM® PC, XT® & Compatibles
- Half Height

\$79⁹⁵

List Price \$199

TEAC 1.2 M - 5 1/4" Drive

- 1.2 Mega Byte Memory
- Fits IBM® AT® & Compatibles
- Double Sided/Double Density

\$99⁹⁵

List Price \$199

TEAC 720K - 3 1/2" Drive

- Double Sided/Double Density
- Fits IBM® PC, XT® & Compatibles
- Half Height

\$99⁹⁵

List Price \$199

TEAC 1.44 M - 3 1/2" Drive

- 1.44 Mega Byte Memory
- Fits IBM® AT® & Compatibles
- Double Sided/Double Density

\$139⁹⁵

List Price \$299

1200 Baud Migent Pocket Modem

Free Terminal Software



Thousands of the most popular Software titles in stock!

- Hayes compatible
- Runs on AC or battery
- Turns on/off automatically
- Small enough to put in your pocket
- Plugs directly into your serial port on many computers
- Easy to use; no switches to set
- On-screen status lights show call progress

Our Low Sale Price

\$79⁹⁵

List \$413

IMMEDIATE ANSWER

800 - BUY - WISE ext. 35

800 - 289- 9473 ext. 35

Outside Service Area call 312 -382-5058



Mail

We Love Our Customers!

COMPUTER DIRECT
22292 N. Pepper Rd.
Barrington, IL 60010

BEST SERVICE IN THE USA

PRICE IS NOT ENOUGH!

- 90 Day Immediate Replacement
- Experts in Customer Satisfaction

- Free Technical Assistance
- Bulletin Board Service

- Fast, Low Cost Delivery
- No Credit Card Fees
- 15 Day Home Trial
- Free Catalogs

MODEM MADNESS SALE

ALL ARE HAYES COMPATIBLE

1200 Baud Internal Modem

- 1200 Baud Bell 212A/103 at 1200/300 BPS
- Automatic Dialing & Answering
- Built-In Speaker with Volume Control
- Separate Voice and Data Jacks
- Both Touch Tone and Pulse Dialing
- Extensive Diagnostics

Our Low Sale Price **\$59⁹⁵** List \$149

2400 Baud Internal Modem

- Full or Half-Duplex Operations
- Auto Dial in Pulse, Tone & Tandem
- FCC Certified and Registered
- Auto Originate and Answer Modes
- Reverse Mode Dial

Our Low Sale Price **\$99⁹⁵** List \$149

2400 Baud External Modem

- 7 System Indicator Lights
- Both Tone & Pulse Dialing
- Built-in Speaker with Volume Control
- For all Computers

Our Low Sale Price **\$114⁹⁵** List \$349

5 1/4" Floppy Disks

100% Certified • Lifetime Guarantee

19¢ each

Double Sided
Double Density

Lots of 25



Made in the USA

3 1/2" Micro Disks

100% Certified • Lifetime Guarantee

Double Sided
Double Density

Lots of 50

no limit



99¢ each

Hi-Speed 180 CPS NLQ 180-II Printer

Lifetime Warranty on Printhead
Our Best Printer Buy



- 2yr. Immediate Replacement
- Dot Addressable Graphics
- High Speed Dot Matrix
- Italics, Elite, Condensed, Pica
- Centronics Parallel Port
- 8K Print Buffer
- Near Letter Quality from front panel
- Low Cost Adapters available
- Pressure Sensitive Controls

Our Low Sale Price
\$149⁹⁵ List \$499

"1 Mega Byte" 20 MHz 0 Wait 386 AT® Computer

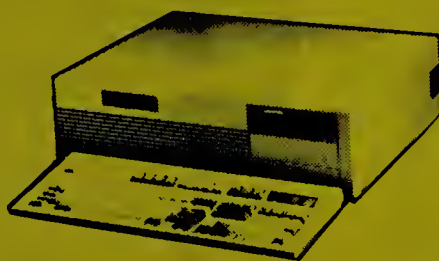


- 1 MEG RAM on Board
- I/O Board - Parallel - Serial - Game Ports
- Award BIOS
- Dual Floppy/Hard Controller
- 101 Keyboard Keytronics
- Clock/Calendar
- 25 MHz Throughput
- Case with Keylock and five integral peripheral slots
- 200 Watt power supply
- 1.2 MEG Floppy Drive

Low Sale Price
\$1999⁹⁵ List \$2995

Intec Multisync Monitor shown \$399.95

*16 MHz 286 IBM® AT® Compatible Computer



Included FREE! MS DOS & GW Basic

- 80286 16 Bit Microprocessor
- 1.2 MEG Floppy Disk Drive
- *16 MHz (Landmark CPU Rating)
- 101 Key "AT®Style" Keyboard for 3 1/2" drives
- Clock/Calendar & Security Keylock
- Floppy/Hard drive Controller included
- 512K RAM Memory Installed
- Parallel & Serial Ports

Low Sale Price
\$899⁹⁵ List \$1995

List \$1995

*640K Laser Turbo XT® Compatible Computer



FREE!

Your choice of
Migent's Ability
or Enrich software
with purchase of computer

- 640K Professional Turbo XT® Computer
- 360K Floppy Disk Drive & Controller
- MS DOS & GW Basic
- Monochrome Card
- Parallel/Serial Ports
- Complete DOS & System Tutor Included FREE!

Our Low Sale Price
\$599⁹⁵ List \$1995

List \$1995

Monitor shown available for \$79.95, List \$179

VISA
MASTER CARD
COD

©IBM, AT, XT are registered trademarks of International Business Machines

Prices do not include Shipping Charges. Call to get Your Lowest Delivered Cost. We insure all shipments at no extra cost to you! All packages are normally shipped UPS Ground. 2nd Day or Overnight delivery available. Minimum shipping charge per order is \$3.75. Illinois residents add 6 1/2 % sales tax. We ship to all points in the U.S.; Canada, Puerto Rico, Alaska, Hawaii, Virgin Islands and APO-FPO. (Monitors only shipped in Continental USA) Prices and availability subject to change without notice.

Circle 213 on reader service card

Compu\$ave



1-800-877-8855
International Orders are Welcome!

BOARDS

#9 Pepper Sgt. + .. 1299 Orchid Design Pro ... 298
Adv. Dig. Slave 565 Paradise VGA+ 258
AST 5251-11E 545 Paradise VGA + 16 295
ATI VGA Wonder ... Save Quadram JT Fax 262
BOCA RAM AT 139 Sigma VGA H 238
Genoa VGA HiRes .. 349 STB VGA EM 512K .. 358
Intel Above Board . Save Video 7 V RAM 468
Intel Inboard 386 ... Save Video 7 Vega VGA .. 262
Alloy, Artist, Everex, Hercules, Metheus CALL
Number 9, Tatum, Talltree, Verticom, VMI ... CALL

DISK DRIVES

Miniscribe 30 Card .. 369 Plus Hardcard 40 ... 638
Miniscribe 40 Mb 309 Seagate 20Mb Kit .. 262
Miniscribe 3053 429 Seagate 30Mb Kit .. 275
Miniscribe 6085 549 Seagate 80 Mb 545
Mountain TD 4440 365 Seagate ST251-1 .. 405
Plus Hardcard 20 498 Toshiba 720 K, 3.5" .. 84
Archive, Alloy, CDC, Genoa, Iomega, Irwin .. CALL
Micropolis, Priam, Maxtor, Rodime, Tecmar .. CALL

SOFTWARE

Appleworks 159 Microsoft Works 91
Carbon Copy Plus .. 107 Multimate Advan. II ... 259
DBase IV 479 Paradox 2.0 459
First Choice 3.0 87 Project 4.0 310
Fastback Plus 104 Peachtree Complete .. 143
Harvard Graph 290 Q & A 3.0 190
Lotus 123 295 Quattro 157
Lotus Symphony 408 Top for DOS 105
Microsoft Excel 289 Ventura Publisher 489
Microsoft Word 4.0 .. 209 WordPerfect 5.0 229

COMPUTERS

Acer 20 Mhz CALL Toshiba 1000 Save
Altos Computers Save Toshiba T1200F 1359
ALR Computers Save Toshiba T1200FB .. 1495
AST Premium 286 Save Toshiba T1200HB .. 2365
AST Premium 386 Save Toshiba T1600 3295
Compaq 286/386 Save Toshiba T3100E ... 2799
Everex Computers ... CALL Toshiba 3200 3565
Intel 25 Mhz Save Toshiba 5100 4575
Mitsubishi 286/386 Save Toshiba 5200 6295
NEC Laptops Save Wyse 2108 949
NEC Powermates Save Wyse 2112 1375
Packard Bell 12 Mhz .. 1249 Wyse 2200 1345
Samsung 20 Mhz Save Wyse 3216 2125
Televideo 286/386 Save Zenith Supersport . 1579
Unisys 286/386 Save Zenith SS 286 3265
Mitsubishi MP286 Laptop : 20 Mb 2298
Sperry PC IT : 512kb / 44Mb HD / Keyboard 2795
Altos, ITT, Sharp & Other Models CALL

TERMINALS

Altos IV 355 Televideo 955 379
Altos V 485 Wyse 30 289
IBM 3151 385 Wyse 50 362
Klitrion KT-70 PC ... 359 Wyse 60 399
Link MC-5 405 Wyse 85G 375
Televideo 905 299 Wyse 105 Save
Adds, CIE, Falco, Link, Qume & Other Models ... CALL

MICE

Logitech C7 64 Microsoft w/windows .. 129
Logitech HiRes 78 Mouse Systems PS/2 ... 79
Microsoft w/ paint 99 Mouse Systems PC II ... 89

PLOTTERS

Calcomp 1023GT 3785 HP Draft DXL 3729
Calcomp 1043 GT 5595 Ioline 3500 2375
Calcomp 1044GT .. 10,245 Ioline 3700 2995
Houston DMP 61 2995 Ioline 4000 3695
Houston DMP 62 4065 JDL 850 GL 2799
HP 7440 A 955 Roland 885 689
HP 7475 A 1395 Roland 980 869
HP 7550 A 2895 Roland DXY8800 945
HP 7570A 2995 Roland DXY 1100 ... 889
HP 7595 7795 Roland GRX Save
Bruning, Enter, Numonics, Taxan, Versatec CALL

DIGITIZERS

Calcomp 12 x12 348 Houston Hi Pad + . Save
Calcomp 44 x 60 3895 Kurta IS 3 CALL
Calcomp 36 x 48 3395 Kurta IS 8.5 x 11 239
GTCO 24 x36 1945 Kurta IS 12 x 12 282
GTCO 36 x 48 2395 Kurta IS 12 x 17 482
Hitachi 11 x 11 439 Summa 12 x 12 + ... 328
Hitachi Puma Pros ... Save Summa 12 x 18 558

MODEMS

ATI 2400 ETC. 152 Practical 1200I 65
Anchor 2400E 145 Prometheus 2400B/2 ... 129
Practical 1200 Ext 78 Prometheus 2400G 149
Cardinal 2400 Ext .. 139 Racal-Vadic 2400VP ... 388
Cardinal 2400 Int. .. 109 USR Sportsters Save
Hayes 1200 275 USR Courier 2400 288
Hayes 2400 415 USR HST 9600 588
Multitech 224 EH ... 368 World Port Pocket Save
Multitech 224 EC ... 305 Zoom 2400 HC 119
AST, Avatex, Case, Packard Bell, Ventel CALL

PRINTERS

Alps 324 E 729 NEC P5200 505
Alps Allegro 24 342 NEC P5300 665
Canon BJ 130 699 NEC P9XL 1038
Citizen120D 145 Panasonic 1080iM2 159
Citizen 180D 162 Panasonic 1091iM2 175
Citizen MSP 55 ... 462 Panasonic 1124 Save
Fujitsu DL3400 519 Panasonic 1592 368
HP Desk Jet 699 Panasonic 4450 1545
HP Paint Jet 1049 Star NX-1000 165
Okidata ML320 ... 329 Star NX-1000R Color .. 218
Okidata ML 390 .. 455 Star NX-2400 308
NEC LC 890 3145 Toshiba 321SL 469
NEC P2200 335 Toshiba 341SL 629
Brother, C.Itoh, Data Products, Diconix, Epson
Genicom, OTC, QMS, Qume, Varityper, TI CALL

MONITORS

Amdek 1280 638 NEC Multisync XL .. 2145
Amdek 732 399 PGS Ultra 16 879
Gold Star TTL Mono .. 75 Samsung TTI 79
Genius 402/420 Save Sigma Laser 19" ... 1765
Hitachi Save Sony 1302 645
Magnavox Save Taxan Save
Mitsubishi 1381A 475 Tatum Multiscan 459
Monitem Save Wyse 650 VGA 449
NEC Multisync II 575 Zenith 1490 578
Seiko CM 1430 : 14" Multisynch 1024x768 595

SCANNERS

HP Scanjet 1399 PC Hand Scanner 152
Logitech Scan Man .. 189 PGS LS-300 w/paint 725
AST, HP, Taxan, Panasonic, Datacopy Call

Mail Address: Compu\$ave - 4207 S. 37th Street - Dept C3 - Phoenix, AZ 85040. Order lines open: Mon.- Fri. 7 am - 6 pm, Sat.: 9 am - 2 pm. Prices reflect cash discounts and are subject to change without notice. We do not guarantee compatibility. DOA's are repaired or replaced, please call for a RMA. Major credit cards and selected PO's are accepted.

INTERNATIONAL SALES (602)437-4855

FAX (602)437-9685

CUSTOMER SERVICE (602)437-4856

Circle 72 on reader service card

Dysan	2 Box		5 Box		10 Box	
	Double Side	High Density	Double Side	High Density	Double Side	High Density
5 1/4"	8.15	12.80	7.90	12.45	7.70	12.15
	11.40	10.85	10.85	10.40	10.50	10.05
	11.30	10.85	11.50	10.95	10.95	10.95
3 1/2"	15.80	15.50	15.50	15.25	15.25	15.25
	41.85	41.10	41.10	40.50	40.50	40.50
8"	18.25	17.35	17.35	16.65	16.65	16.65
	19.95	19.05	19.05	18.25	18.25	18.25
	24.30	23.10	23.10	20.20	20.20	20.20

Minimum order \$20.00 "No Surcharge on Visa Master Card." COD orders add \$3.00. Surface Shipping UPS add \$3.00 per 100 for 3 1/2" or 5 1/4", add \$4.00 per 100 for 8". U.S. Mail delivery add 9%. "Prices subject to change without Notice."

Verbatim	2 Box		5 Box		10 Box	
	Double Side	High Density	Double Side	High Density	Double Side	High Density
5 1/4"	7.65	7.45	7.45	7.25	7.25	7.25
	8.95	8.80	8.80	8.60	8.60	8.60
3 1/2"	13.95	13.65	13.65	13.30	13.30	13.30
	13.50	13.40	13.40	12.95	12.95	12.95
	14.95	14.90	14.90	14.80	14.80	14.80
	39.95	38.95	38.95	37.95	37.95	37.95

Circle 60 on reader service card

SAVE 20-40% ON TANDY COMPUTERS! America's #1 Compatibles

New! 80286 Based
Tandy 1000 TL



We Now
Offer
Similar
SAVINGS
on



- Powerful 8 MHz 80286 Microprocessor
- 640K RAM Enhanced Keyboard
- Automatically Loads MS-DOS and DeskMate Without Diskettes

PACKARD BELL

SAVE
HUNDREDS

- Complete Line of Tandy Equipment in Stock.
- Courteous, Efficient Service & Customer Support.
- Tandy Laptops...SAVE \$500 or more!
- We are Experts with NON-Tandy Peripherals...SAVE!!!
- Tandy 1000 SL...\$659!
- This is our Seventh Year of Discount Operation.
- SALE: 30 Meg. Hardcards, list \$599, OUR PRICE \$399!

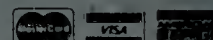
CALL OR WRITE TODAY...
SEE HOW MUCH YOU CAN SAVE!

1-800-447-4225

Colo. residents, shipping and customer service, call: (303)249-9125

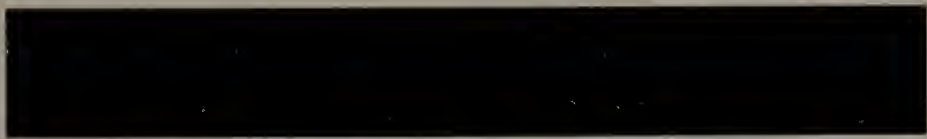


GREAT WESTERN
ELECTRONICS



HOURS: 9-5 MST, M-F
232 MAIN ST • MONTROSE, CO 81401

Circle 122 on reader service card



BUY SMART. USE SMART.

PC World guides business buyers through the entire buying process, from purchase to integration to upgrade to trade-in. First, we deliver the essential product information and unbiased reviews they need to make smart PC buying decisions. Then we follow up, month after month, with the answers, power tips, and advice they need to use their PCs more productively. To them, *PC World* delivers more value than other PC books.

**No wonder more business buyers
depend on *PC World* than any
other PC publication.**

PC World delivers more to its advertisers, too. More objective reviews. More receptive business buyers. More sales. Which makes *PC World* a very smart place to sell your product.

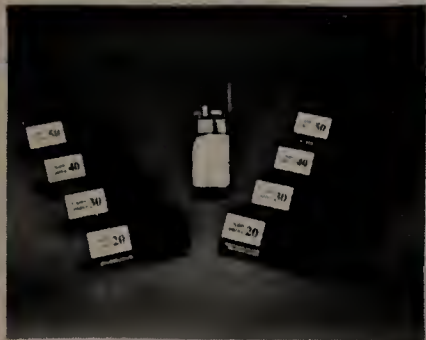
PC WORLD

Find out what's in it for you.

Circle 900 on reader service card

MiniScribe

Solutions for Data Storage



Our Complete Family
of Card Drives™

30 Day "WorryFree" Guarantee

If for any reason, you are not completely satisfied with any product, simply return it for a prompt and courteous refund!

All products include a
**ONE YEAR
Warranty!**

Card Drive™ HARD CARDS

Card Drive 20-8225 68ms	\$279
Card Drive 30-8438 68ms	\$309
Card Drive 40-8450 46ms	\$359

--Features--

- Available for PC/XT and most Tandy models.
- Quality engineered for reliability.
- Auto park heads.
- ONE YEAR Warranty.
- Super easy installation and setup.

PC/XT KITS

20Mb ST225	half height	65ms	\$244
30Mb M8438	half height	65ms	\$279
40Mb M8450XT	half height	46ms	\$319
62Mb M3675	half height	61ms	\$379
80Mb ST251/PS180	half height	40ms	\$499
130Mb M6085/PS180	full height	28ms	\$699

All kits come **COMPLETE** with the drive, controller, cables, How-To Manual and mounting hardware. 40Mb and larger drives also include partitioning software.

AT/386 DRIVES

Seagate

40Mb Seagate	ST251-1	half height	28ms	\$399
71Mb MiniScribe	M6085	full height	28ms	\$539
*110Mb MiniScribe	M6128	full height	28ms	\$629

High Capacity Drives!

160Mb MiniScribe	M3180E	half height	16ms	\$1375
340Mb MiniScribe	M9380E	full height	16ms	\$2195

These drives come with an ESDI "1 to 1" high performance

Hard/Floppy Controller!

All drives include AT mounting hardware and "Disk Manager" partitioning software!! *110Mb drive requires an RLL controller

Never a Surcharge
for Visa or
MasterCard Orders!



FACTORY-TRAINED
TECHNICIANS
are on hand
to answer your
questions!

HARD DRIVES
International
An IDN Company

1208 E. Broadway Rd. #110 • Tempe, AZ 85282
(602) 784-1038



International Orders: (602) 784-1038
Toll Free Order Status: (800) 234-5197
TELEX: 405765 FAX: (602) 829-9193

Prices and availability subject to change without notice. All items are NEW. 5% surcharge for American Express and COD orders. P.O.'s accepted NET 20 - subject to 9% surcharge. Add \$11 shipping for EXPRESS APO/FPO orders. 30 Day Guarantee conditions: shipping & handling charge is not refundable; product must be undamaged and in original condition. PCG0389

Circle 313 on reader service card

MORE FREEDOM OF INFORMATION!

PC World Reader Service makes it easy to get all the free information you need to make sound PC purchase decisions.

Just look up the card in the back of this issue, find the product or company name in our product indexes, circle the right number(s) on the card, and mail it in.

We've even paid the postage. Information doesn't get any freer than that!

PC WORLD

HOURS:

7 AM to 7 PM Monday-Friday

8 AM to 2 PM Saturday

Call on Sunday

Systems

2625 BUTTERFIELD ROAD • SUITE 103N • OAK BROOK, ILLINOIS 60521

Visa, MasterCard, Discover
and American Express
Accepted.**IBM-NOVELL**
Network Support
\$85/Hour
1-800-634-8215**COMPAQ**
Laptop SLT 286
20/40 Mb
\$3800/\$4200**IBM PS/2**
Model 80
115 Mb
\$5900**TOSHIBA**
T3200/40
Laptop
\$3500**1% Consultant**
and Reseller
Accrual Program
(\$52,485 paid in 1988)**IBM PS/2**

Model 25—Color	\$1250
Model 30—286 20 Mb Disc	\$1810
Model 30—20 Mb Disk	\$1585
Model 50—20 Mb Disk	\$2390
Model 50—30 Mb Disk	\$2700
Model 50—60 Mb Disk	\$3120
Model 60—44 Mb Disk	\$3200
Model 70—60 Mb Disk	\$3800
Model 70—120 Mb Disk	\$5300
Model 80—44 Mb Disk	\$4250
Model 80—70 Mb Disk	\$4800
Model 80—115 Mb Disk	\$5900
Model 80—314 Mb Disk	\$8200

COMPAQ

286 Mod 1/640 K	\$1670
286 Mod 1/40 Mb-640 K-Monitor	\$2150
386 Deskpro/20 60 Mb	\$5200
386 Deskpro/20 130 Mb	\$6400
386 Deskpro/20 300 Mb	\$8500
386 Deskpro 20E 40 Mb/110 Mb \$4475/5400	
386S Deskpro Mod 1	\$2660
386S Deskpro 20Mb/40Mb	\$3150/3640
386/25 110Mb/300Mb	\$6800/8900
Portable II Model 4	\$2500
Portable III Model 20	\$3400
Portable III Model 40	\$4050
Portable 386 Model 40	\$5400
Portable 386 Model 100	\$6800
Laptop SLT 286 20/40	\$3800/4200

TOSHIBA LAPTOPS

T1000	\$775
T1200FB	\$Call
T1200HB	\$2399
T1600	\$Call
T3100/20e	\$2800
T3200	\$3500
T5100	\$4600
T5200 40 Mb/100 Mb	\$6000/6800

ZENITH LAPTOPS

286/20 Super Sport	\$3300
386/40 Turbo Sport	\$5600

PACKARD-BELL

386 System	\$2600
286 System	\$1200
8088 System	\$795

DISC DRIVES

SEAGATE 20 Mb Kit	\$259
SEAGATE 30 Mb Kit	\$295
SEAGATE 40 Mb Kit XT	\$366
SEAGATE 40 Mb (ST251-1)	\$439
SEAGATE 80 Mb	\$639
TOSHIBA 1.44 Mb Floppy	\$125
PROCOM Ext 5.25" for PS/2	\$290
COMPAQ 1.44 1/3 HT	\$195

Hardcards

MINISCRIBE 20 Mb Hard Card	\$379
PLUS 20 Mb/40 Mb Hard Card	\$535/647
PROCOM 30 Mb/40 Mb	\$429/519
PROCOM 45 Mb for PS/2	\$795
MAYNARD 20 Mb	\$Call

FAX

SHARP FO220/FO300	\$950/1159
SHARP FO420/FO500	\$1300/1400
TOSHIBA 3010	\$1275

TAPE

IBM 6157 for PS/2	\$1350
IRWIN 40 Mb Int/Ext	\$465
MAYNARD 60 Mb XT/AT Int/Ext	\$675/881
MAYNARD 60 Mb for PS/2	\$899
MONAICH 60 Mb	\$1199

MONOCHROME MONITORS

AMDEK 210/410	\$79/145
COMPAQ Mono Amber/Green	\$210
COMPAQ VGA Mono	\$210
IBM PS/2 8503	\$200
MULTISYNC GS	\$195
PACKARD BELL Amber/Green	\$85

COLOR/EGA MONITORS

AMDEK C600/C722	\$344/435
IBM PS/2 8512	\$435
PGS UltraSync	\$500
SAMSUNG RGB	\$245
ZENITH 1390	\$405

VGA/CAD MONITORS

COMPAQ VGA Color	\$520
CSA 1016	\$1779
HITACHI 4119	\$2260
IBM PS/2 8513	\$515
IBM PS/2 8514	\$1075
MITSUBISHI 6905/6922	\$2330/1934
NEC MultiSync XL	\$2070
NEC MultiSync Plus	\$879
NEC MultiSync 2	\$575
ZENITH 1490	\$619

NETWORK**NOVELL**

SANTA CLARA Diskless Workstation \$631	
WESTERN DIGITAL 3 Node LAN kit	
w/Western Digital software	\$700
Entry-level 286 Starter Kit, 4 Users	\$470
NOVELL 286 Software w/Keycard	\$1500
NOVELL 286 Software V.212	\$1939
NOVELL SFT Netware Level I	\$2120
NOVELL SFT Netware	
Level II V2.1	\$2740
Nondedicated Netware Software 286	
w/Keycard	\$1470

INTERFACE CARDS

ARCNET PC110 LANBoard PS2	\$520
ARCNET PC110 LANBoard	\$185
ARCNET PC210 LANBoard	\$235
ETHERNET Interface Connector	\$325
ETHERNET Plus Board (for 286)	\$690
G-NET Interface Card w/cable	\$294
WESTERN DIGITAL	
Ethernet Cards	\$260

ACCESSORIES

ARCNET Passive Hub	\$80
ARCNET Active Hub	\$469
Ethernet Terminators	\$38

*Novell trained and authorized
sales and support.***IBM**

IBM Adapter Card	\$450
IBM 8wk Expander	\$425
PC Lan Program	\$150

TERMINALS

WYSE 50 Amber or Green	\$370
WYSE 60 Amber or Green	\$295
WYSE 85	\$394

SOFTWARE

Aldus Pagemaker	\$459
Auto Cad 10.0	\$2200
COMPAQ DOS 3.31	\$89
dBase IV	\$455
DisplayWrite IV	\$290
IBM DOS 3.3/4.01	\$90/110
IBM OS/2 Standard 1.0	\$235
IBM OS/2 Extended	\$550
Lotus 1-2-3 V 2.01 5 1/4 3 1/2"	\$292/299
Lotus Symphony	\$420
Multimate Advantage 2	\$259
Norton Advanced Utilities	\$75
Paradox 2.0	\$418
Smartcom II/III	\$90/150
Ventura Publishing	\$490
Word Perfect 5.0	\$225

LASER PRINTERS

HP DeskJet	\$675
HP LaserJet II/LiD	\$1675/2999
HP ScanJet	\$1075
NEC LC890	\$3244
PANASONIC KX4450	\$1590
TOSHIBA PageLaser	\$2499

PRINTERS**Epson**

FX 850 260/84 cps	\$345*
FX 1050 260/84 cps	\$510*
EX 800 300/60 cps	\$459
LO 850 264/88 cps	\$510*
LQ 1050 264/88 cps	\$745
LO 950	\$Call
LO 2550	\$929*
DFX 5000	\$1399

Okidata

320/21	\$365/477
390/91	\$464/635
393	\$980

Panasonic

KX 1180 I	\$Call
KX 1191 I	\$Call
KX 1092 I 240/48 cps	\$320
KX 1124 192/48 cps	\$319

KX 1592 180/38 cps	\$379
KX 1595 240/51 cps	\$445
KX 1524 240/80 cps	\$540
KX 3131 17 cps LO	\$290
KX 3151 22 cps LO	\$461

NEC

P2200 170/55 24 Wire	\$339
8850 55 cps	\$1125
P5200	\$507
P5300	\$705
P5XL 290/100 cps	\$829
P9XL 400/140 cps	\$1025
Color Option	\$118

IBM

Quickwriter	\$Call
Quietwriter III	\$1125
Proprinter III	\$485
Proprinter XL 24	\$709
Proprinter III XL	\$645

Toshiba

321 S/L 216/72 cps	\$499
341 S/L 216/72 cps	\$630
351 SX 350/100 cps	\$1000

**COMMUNICATION/
EMULATION**

IBM PS/2 50-80 5250 Emulation	\$675
IBM PS/2 50-80 5250 Emulation	\$675
IBM PC XT/AT 5250 Emulation	\$675
AST PC XT/AT 5250 Emulation	\$575
IBM PC XT/AT 3270 Emulation	\$450
IBM PC XT/AT 3278/9 Emulation	\$490
IRMA Board	\$Call
US ROBOTICS 1200 Int	\$100
US ROBOTICS 2400 Int	\$159
HAYES 1200B Int/SCII	\$243/282
HAYES 1200 Ext	\$277
HAYES 2400 Ext	\$419
HAYES 2400B w/SCII Int	\$418
EVEREX 1200 w/SW	\$75
EVEREX 2400 Int/Ext	\$137/195
VENTEL 1200/1200+	\$190/228
VENTEL 2400/2400 Ext	\$290/380

MULTIFUNCTION CARDS

EVEREX MagicCard OK	\$100
AST 6 Pack w/384K	\$Call
AST Advantage/2 for PS/2	\$Call
COMPAQ 1Mb Memory 386/20 & 20E	\$650
COMPAQ 4Mb Memory 386/20 & 20E	\$2200
COMPAQ 1Mb Memory 386S	\$635

VIDEO BOARDS

COMPAQ VDU	\$Call
COMPAQ VGA	\$419
GENOA Super Hi Res 800X600	\$175
GENOA Super VGA	\$310
PARADISE Auto Switch-480	\$195
PARADISE VGA	\$275
RP MonoGraphics	\$69
VEGA Deluxe	\$249
VEGA VGA	\$275

CHIPS

Intel	
8087-1/2/3	\$220/149/109
80287-6/8/10/A	\$167/220/259/355
80387-16/20/25/SX	\$450/530/695/405

ACCESSORIES

AB Switchbox	\$40
Keytronics 101 Keyboard	\$100
Printer Cable 6'/10'	\$20/25
6 Outlet Surge	\$25

MICE

LOGITECH HiRes	\$95
LOGITECH PS/2	\$69
LOGITECH C7 Serial	\$69
LOGITECH Bus	\$74
DEXXA Mouse	\$69
Microsoft Mouse	\$119
IBM Mouse	\$75

*"We Will Beat Any Price". . . Dick***1-800-634-8215***In Illinois Call . . .***1-312-654-4100**

SALES AND QUOTES (Outside Illinois): 1-800-634-8215

SHIPPING AND TECHNICAL SERVICE: 1-312-654-4170

QUOTE-A-FAX: 1-312-325-4969

- Corporate and volume purchases invited. Call Dick.
- Lease available.
- 24 hour burn in on all CPUs.
- Stock orders placed by 3:00 CDT shipped same day.
- 100% financing available.
- Credit card purchases subject to verification.

- Prices reflect 3% cash discount.
- Allow 10 days for personal checks to clear.
- Wire transfer accepted.
- Minimum \$5.00 shipping/handling charge.
- Returns subject to restocking charge.
- Prepay and take 1% discount.
- Educational P.O.'s welcome.

** System prices*

Circle 125 on reader service card

WE OFFER YOU ABSOLUTELY NOTHING! EXCEPT THE LOWEST PRICES ON COMPUTER PRODUCTS...EVER!



CALL 707 COMPUTER WHOLESALERS **BEFORE** YOU BUY

1-800-426-2489



DESKTOP COMPUTERS

IBM PERSONAL SYSTEM/2™	
8086 SYSTEMS - 8MHz	
MODEL 25 MONO, 512K, 720DR	\$1,045.62
MODEL 30-002, 640K, 2-720 OR, MCGA	\$1,259.85
MODEL 30-021, 720 DR, 20MB, MCGA	\$1,699.66
80286 SYSTEMS - 10MHz	
MODEL 30-286, 512K, 1.4 OR	\$1,499.04
MODEL 50-021, 1MB, 1.4 OR, 20MB, VGA	\$2,609.79
MODEL 502-031, 1MB, 1.4 DR, 30MB, VGA	\$2,943.19
MODEL 60-041, 1MB, 1.4 DR, 44MB, VGA	\$3,699.95
80386 SYSTEMS - 16 & 20MHz	
MODEL 70-E61, 1MB, 1.4 DR, 60MB VGA	\$4,400.01
MODEL 70-121, 2MB, 1.4 DR, 121MB, VGA	\$5,799.47
MODEL 80-071, 2MB, 1.4 DR, 70MB, VGA	\$5,330.88
IBM PERSONAL SYSTEM/2™ DISPLAYS	
MONOCHROME 8503	\$216.39
COLOR 8512 (14")	\$449.90
COLOR 8513 (12")	\$562.12
COLOR 8514 (16")	\$1,150.55
COMPAQ™	
DESKPRO 286/12, MOD 1, 640K, 1.2 DR	\$1,750.31
DESKPRO 286, AS ABOVE W/40MB	\$2,299.44
DESKPRO 286, AS ABOVE W/80MB	\$2,850.89
DESKPRO 386-20E, 1MB, 1.2 OR	\$3,899.10
DESKPRO 386/20 MOD 60, 1MB	\$5,546.99
COMPAQ 386S/16 MOD 1, 1MB, 1.2 DR	\$2,862.61
COMPAQ 386S/16 MOD 20, 1MB	\$3,389.75
COMPAQ 386S/16 MOD 40, 1MB	\$3,900.08
COMPAQ DESKPRO 386/25 MOD 110, 1MB	\$7,590.65
COMPAQ DESKPRO 386/25 MOD 300, 1MB	\$9,789.55
EVEREX	
EVEREX 286/10 512K, 1.2 DR	\$1,119.99
EVEREX 386/16, 1MB, 1.2 DR	\$1,999.26
EVEREX 386/20, 1MB, 1.2 OR, 1:1 HD	\$2,295.81
LASER	
LASER XT TURBO 10 MHz W/640K, 20MB	\$1,199.28
2 380 DR, SER/PAR, CLK/CAL, TTL MONO	
PACKARD BELL W/NATIONWIDE 1 YEAR SERVICE	
* VXX8 XT TURBO, 640K, 1 360 DR, DOS,	\$639.03
GW-BASIC, SER/PAR, COLOR/MONO CARD	
* PB286 10 MHz, 1 WAIT, 640K, 1.2 DR	\$1,099.44
* PB386, 25MHz, TOWER	CALL
WYSE COMPUTERS W/ KEYBOARDS	
MODEL 2108 286/8, 512K, 1.2 DR	\$925.92
MODEL 2112 286/12, 1MB, 1.2 DR	\$1,349.50
MODEL 2214 286/12, 1MB, 1.2 DR	\$1,999.49
MODEL 3216 386/16, 1MB, 1.2 DR	\$2,125.68

MONO MONITORS

IMTEC, AMBR/GRN, 12", 720 X 350	\$85.99
NEC MONOGRAPH, B&W, 16", 1024 X 1024	\$1,279.03
NEC MULTISYNC GS, 8&W, 14", 720 X 480	199.11
* PACKARD BELL, AM8R/GRN, 12", 720 X 350	\$69.99
* PACKARD BELL, A/B&W, 14", FLAT SCR, T/S	\$99.55
WYSE 530, AM8R/GRN, 14", 720 X 350	\$175.36
WYSE 700, B&W, 15", 1280 X 800	\$699.77
WYSE 7190, 19", B&W, 1280 X 1040	CALL

COLOR MONITORS

AMDEK 722, 13", 720 X 350, .31	\$444.89
GOLDSTAR, 14", 640 X 200, .43	\$249.60
IMTEC COLOR, 14", 640 X 200, .43	\$269.67
MAGNAVOX CM8762, 14", 640 X 240, .42	\$249.99
* PACKARD BELL PB1452, 14" 640 X 200, .52	\$205.60
SAMSUNG COLOR, 12", 640 X 200, .43	\$259.40

MONO/COLOR BOARDS

COLOR GRAPHICS W/PAR, 640 X 200	\$69.33
MONOCHROME GRAPHICS W/PAR, 720 X 348	\$69.85

DISK DRIVES

COMPAQ 360K F/H FDD PC/XT	\$47.72
MAXTOR 1140 116MB, F/H, 26MS FOR AT	\$1,679.18
MAXTOR 4380S 320MB, F/H, 18MS W/SCSI	\$2,299.34
* PRIAM 130MB, F/H, 20MS FDR AT	\$1349.90
SEAGATE ST225 20MB, H/H, 65MS W/MFM	\$265.25
SEAGATE ST238 30MB, H/H, 65MS W/RLL	\$289.21
SEAGATE ST251 40MB, H/H, 40MS FOR AT	\$339.75
SEAGATE ST251-1 40MB, H/H, 28MS FOR AT	\$419.05
SEAGATE ST1251-PS/2 20MB, H/H,	\$359.99
SEAGATE ST250R 40MB, HH, 75MS W/RLL	\$319.42
SEAGATE ST4096 80MB, F/H, 28MS W/SW	\$699.90
TAXAN EXT, 360K FDD FOR PS/2	\$239.25
TEAC 360K, H/H FDD PC/XT	\$69.79

TAPE DRIVES

ARCHIVE 40MB INT XT/AT	\$339.59
ARCHIVE 60MB INT XT/AT	\$599.42
* MAYNARD 2200HS, 2.2 GIGABYTES	\$4,439.05
MOUNTAIN 40MB INT/EXT	IN STOCK
MOUNTAIN 150MB EXT	\$1,699.17

PRINTERS

CITIZEN 120 D, 9 PIN, 80 COL, 120 CPS	\$149.41
CITIZEN 180 D, 9 PIN, 80 COL, 180 CPS	\$169.50
EPSON EX 800, 9 PIN, 80 COL, 300 CPS	\$379.18
EPSON FX 1050, 9 PIN, 132 COL, 264 CPS	\$439.61
EPSON LQ 500, 24 PIN, 80 COL, 180 CPS	\$309.10
EPSON LQ 850, 24 PIN, 80 COL, 264 CPS	\$529.26
EPSON LQ 950, 24 PIN, 110 COL, 264 CPS	\$589.22
EPSON LQ 1050, 24 PIN, 132 COL, 264 CPS	\$729.65
EPSON LQ 2550, 24 PIN, 132 COL, 240 CPS	\$929.66
EPSON LX-800, 9 PIN, 80 COL, 180 CPS	\$199.90
HP LASERJET SERIES II, 8 PG/MIN	\$1,799.21
HP DESKJET INKJET, 4 PG/MIN	\$685.32
NEC P2200, 24 PIN, 80 COL, 170 CPS	\$359.95
NEC P5200, 24 PIN, 80 COL, 265 CPS	\$539.84
NEC P5300, 24 PIN, 136 COL, 265 CPS	\$724.32
NEC P960 XL, 24 PIN, 136 COL, 400 CPS	\$1,025.39
NEC 3550 SPINWRITER, 136 COL, 35 CPS	\$799.05
NEC 8850 SPINWRITER, 136 COL, 65 CPS	\$1,169.11
* PANASONIC 1091i, 9 PIN, 80 COL, 192 CPS	\$179.24
* PANASONIC KX-P1124, 80 COL, 192 CPS	\$307.22
* PANASONIC KX-P1524, 130 COL, 240 CPS	\$549.35
* PANASONIC KX-P1595, 130 COL, 240 CPS	\$475.80
* PANASONIC LASER PARTNER, 11 PG/MIN	\$1,499.33
STAR MICRONIX NX-15, 130 COL, 120 CPS	\$332.59
STAR MICRONIX NX-1000, 80 COL, 144 CPS	\$161.64
TOSHIBA P321 SL, 24 PIN, 80 COL, 216 CPS	\$482.20
TOSHIBA P341 SL, 24 PIN, 132 COL, 216 CPS	\$699.08
TOSHIBA P351 SX, 24 PIN, 132 COL, 360 CPS	\$1,019.71

FAX MACHINES

* CANON FAXPHONE 8, G3, 18 SEC/PG	\$769.66
DATACOPY MICROFAX BOARD	\$599.72
MURATA M1200, G2/G3, 18 SEC/PG	\$710.45
MURATA M1600, G2/G3, 18 SEC/PG	\$874.30
QUADRAM J.T. FAX 9600, PC/XT/AT	\$559.44
SHARP FO-300, G2/G3, 18 SEC/PG	\$1,220.84
SHARP FO-420, G2/G3, 18 SEC/PG	\$1,379.11
TOSHIBA T3000, G3/G3, 1PG, 15 SEC/PG	\$1,055.59
TOSHIBA T3300, G2/G3, 5 PG, 15 SEC/PG	\$1,225.84

TERMINALS

WYSE MODEL 30 AMBER OR GREEN	\$299.11
WYSE MODEL 50 AMBER OR GREEN	\$369.78
WYSE MODEL 60 AMBER, GREEN, B&W	\$309.94
WYSE MODEL 60 KEYBOARD	\$100.66
WYSE MODEL 85 AMBER OR GREEN	\$375.76
* WYSE MODEL 150 B&W	\$369.51

LAPTOP COMPUTERS

* COMPAQ SLT 286/12, 640K, 1 DR, 20MB	CALL
MITSUBISHI 286/12, 640K, 2 OR, BKLT	\$1,959.05
MITSUBISHI 286/12, 1 DR, 20MB, BKLT	\$2,459.48
NEC MULTISPEED EL2, 640K, 2 DR, BKLT	\$1,449.61
NEC MULTISPEED HD, V30, 1 DR, 20MB	\$2,149.88
NEC ULTRALITE V30/10, 640K, SER/PAR, BKLT	CALL
TOSHIBA 1000 80C86/5, 512K, 1DR	\$789.49
TOSHIBA 1200FB AS ABOVE W/BKLT	\$1,789.19
TOSHIBA 1200HB, AS ABOVE W/BKLT	\$2,499.07
TOSHIBA 1600 286/12, 1MB, 1DR, 20MB	\$2,959.55
TOSHIBA 3100 286/8, 640K, 1DR, 20MB	\$2,599.19
TOSHIBA 3100E 286/12, 1MB, 1DR, 20MB	\$3,489.80
TOSHIBA 3200 286/12, 1MB, 1 DR, 40MB	\$3,699.20
TOSHIBA 5100 386/16, 2MB, 1 DR, 40MB	\$4,799.89
ZENITH SUPERSPORT 286/12, 1MB, 30MB	\$3399.45

EGA/VGA BOARDS

COMPAQ VGA, 640 X 480, 256 COLOR	\$449.72
CONTROL SYSTEMS ARTIST XG10	\$1,929.88
CONTROL SYSTEMS ARTIST 10	\$2,099.70
EPIC, 480, EGA, CGA, MDA, HERC 640 X 480	\$224.66
GENOA SUPER EGA, HI-RES 640 X 480, 256K	\$215.34
GENOA SUPER VGA, 800 X 600, 256K	\$275.81
GENOA SUPER VGA, 768 X 1024, HI-RES	\$389.23
NEC MVA 1024, 384K	\$949.90
NEC MVA 1024 ENHANCED, 768K	\$1,049.08
ORCHID DESIGNER VGA, 640 X 480, 256K	\$289.47
* PARADISE VGA PLUS, 800 X 600, 256K	\$289.41
* PARADISE VGA PRDF, 800 X 600, 256K	\$499.50
* PARADISE AUTOSWITCH EGA, 640 X 480,	\$199.95
STB AUTDEGA, 640 X 350, 756K, 64 COLDR	\$149.47
STB VGA EXTRA/EM, 640 X 480, 512K	\$369.95

EGA/VGA MONITORS

AMDEK 732, 12", 800 X 600, .28	449.11
GOLDSTAR EGA, 14", 640 X 350, .31	\$369.47
GOLDSTAR VGA, 14", 640 X 480, .31	\$439.93
HITACHI HM 4119, 19", 1024 X 768	\$2,209.38
IMTEC VGA MULTI-MODE, 14", 800 X 560, T/S	\$469.15
MAGNAVOX EGA 9CM043, 14", 640 X 350, .39	\$385.41
MAGNAVOX VGA 9CM062, 14", 640 X 480, .39	\$449.66
MITSUBISHI 6905HL, 19", AUTO TRACKING	\$2,319.10
NEC MULTISYNC II, 13" 800 X 560, .31	\$569.10
NEC MULTISYNC PLUS, 14", 960 X 720, .31	\$879.99
NEC MULTISYNC XL, 19", 1024 X 768, .31	\$1,989.11
SAMSUNG EGA, 14", 640 X 480, .31	\$389.51
TAXAN 770 MULTISYNC, 14", 800 X 600, .31	\$539.29
ZENITH FTM ZCM-1490, 14", 640 X 480, .28	\$669.84
WYSE WY-650, 12", 800 X 600, .28	\$489.22

MODEMS

EVEREX 1200 BAUD INT	\$109.77
EVEREX 2400 BAUD INT	\$199.89
HAYES SMARTMODEM 1200B INT W/SW	\$289.30
HAYES SMARTMODEM 1200B INT	\$250.72
HAYES SMARTMODEM 1200 EXT	\$289.66
HAYES SMARTMODEM 2400B INT W/SW	\$424.09
HAYES SMARTMODEM 2400B INT	\$379.88
HAYES SMARTMODEM 2400 EXT	\$424.61
* PACKARD BELL 1200B INT	\$69.00
* PACKARD BELL 2400 BAUD INT W/SW	\$129.10
* PACKARD BELL 2400 BAUD EXT	\$159.79
USR SPORTSTER 1200 HALF CARD INT	\$108.52
USR SPORTSTER 1200 EXT	\$128.30
USR SPORTSTER 2400 INT W/SW	\$179.18
USR COURIER HST9600 EXT	\$649.08

CORPORATE & QUANTITY DISCOUNTS AVAILABLE

MOST ORDERS SHIPPED WITHIN 48 HOURS.
Prices reflect 3% cash discount. Allow 10 business days for shipping when paying by personal check. Software, chips and other electronic components are not returnable. Returns are subject to a restocking charge. Prices are subject to change without notice.



Credit card charges are submitted at time of shipment

CALL 707 COMPUTER WHOLESALERS TODAY!

1-800-426-2489

or in Illinois **TECH HOT LINE** **FAX:**
(312) 537-3600 (312) 537-3970 (312) 537-2850

CREDIT TERMS AVAILABLE TO QUALIFIED BUYERS

MEMBER PCW0389

MMC
MICROCOMPUTER
MARKETING COUNCIL
of the Direct Marketing Association, Inc



707 COMPUTER WHOLESALERS

707 Dartmouth Drive Buffalo Grove, IL 60089

Circle 280 on reader service card



**american
Semiconductor®**

TOMORROW'S TECHNOLOGY AT TODAY'S PRICES

- Over a **BILLION \$** in financing available!
- **NEW TURBO LOAN PROGRAM** with no prepayment penalty!
- **TOLL FREE** technical support



**INSTANT
CREDIT**

**CALL TODAY
FOR A
FREE
CATALOG**

NOT A LEASE ★ YOU OWN IT!

\$25.^{mo} ASI TURBO MODEL #5301

100% XT COMPATIBLE
• Selectable 4.77, 8 & 10MHz Processing Speed • 0-16MB RAM Available • Bios • One 360K Floppy Drive • Floppy Controller w/Cable • Eight Expansion Slots • PC/XT-AT Enhanced Keyboard.
RETAIL VALUE \$1099
OUR PRICE \$599

\$25.^{mo} ASI TURBO MODEL #5302

100% XT COMPATIBLE
• Selectable 4.77, 8 & 10MHz Processing Speed • 0-16MB RAM Available • Bios • 16 Bit 8088-1 CPU • One 360K Floppy Drive • Multi I/O (w/Floppy Controller, Clock/Calendar, Parallel, Serial & Game Port) • Eight Expansion Slots • PC/XT Enhanced Keyboard.
RETAIL VALUE \$1599
OUR PRICE \$659

\$35.^{mo} ASI TURBO MODEL #5303

100% XT COMPATIBLE
• Selectable 4.77, 8 & 10MHz Processing Speed • 0-16MB RAM Available • Bios • 8088-1 CPU • Two 360K Half/Height Floppy Drive • Multi I/O (w/Floppy Controller, Clock/Calendar, Parallel, Serial & Game Port) • Eight Expansion Slots • One 10MB Hard Drive (w/ Controller) • AT Enhanced Keyboard.
RETAIL VALUE \$1999
OUR PRICE \$999

\$35.^{mo} ASI TURBO MODEL #5304

100% XT COMPATIBLE
• 8 & 10MHz Processing Speed • 0-16MB RAM Available • Bios • 8088-1 CPU • Two 360K Half/Height Floppy Drive • Multi I/O (w/Floppy Controller, Clock/Calendar, Parallel, Serial & Game Port) • One 20MB Hard Drive (w/Controller) • Turbo/Normal Mode Either Software or Hardware Selectable • Eight Expansion Slots • PC/XT-AT Enhanced Keyboard.
RETAIL VALUE \$2499
OUR PRICE \$1149

\$39.^{mo} ASI TURBO MODEL #5305

100% XT COMPATIBLE
• 8 & 10MHz Clock Speed • 0-16MB RAM Available • Bios • 16 Bit 8088-1 CPU • Two 360K Half/Height Floppy Drives • Multi I/O (w/Floppy Controller, Clock/Calendar, Parallel, Serial & Game Port) • 30MB Hard Drive (w/Controller) • Turbo/Normal Mode Either Software or Hardware Selectable • Eight Expansion Slots • PC/AT Enhanced Keyboard.
RETAIL VALUE \$2999
OUR PRICE \$1299

\$55.^{mo} ASI TURBO MODEL #5306

100% XT COMPATIBLE
• 8 & 10MHz Processing Speed • 0-16MB RAM Available • Bios • 16 Bit 8088-1 CPU • Two 360K Half/Height Floppy Drives • Multi I/O (w/Controller, Clock/Calendar, Parallel, Serial & Game Port) • 20MB Hard Drive (w/Controller) • Turbo Normal Mode Either Software or Hardware Selectable • Eight Expansion Slots • PC/XT-AT Enhanced Keyboard • IBM Compatible Enhanced Graphic Adapter (EGA) • High Resolution EGA Monitor.
RETAIL VALUE \$3899
OUR PRICE \$1779

\$45.^{mo} ASI TURBO MODEL #5501

100% AT COMPATIBLE
10MHz Clock Speed • 80286 Based CPU • 0-16MB RAM Available • Bios • 1.2MB Half/Height Floppy Drive • 20MB Hard Drive (w/Controller) • Eight Expansion Slots • Parallel Port • AT Enhanced Keyboard • Performance 16,12,10,8,6MHz Available.
RETAIL VALUE \$3999
OUR PRICE \$1449

\$49.^{mo} ASI TURBO MODEL #5502

100% AT COMPATIBLE
10MHz Processing Speed • 12MHz Clock Speed • 0-16MB RAM Available • Bios • Intel 80286 Microprocessor • 1.2MB Half/Height Floppy Drive • 30MB Hard Drive (w/Controller) • Eight Expansion Slots • Serial/Parallel Adapter • AT Enhanced Keyboard • Performance 16,12,10,8,6MHz Available.
RETAIL VALUE \$4499
OUR PRICE \$1569

**5
YEAR
BUYER
PROTECTION
PLAN*****

from \$39.^{mo}

LAPTOPS

MODEL #	MONTHLY PAYMENT	OUR PRICE
MITSUBISHI		
286L-210	\$89./	\$3,195.00
286L-220	\$99./	\$3,995.00
286L-VP	\$99./	\$4,595.00
NEC		
Multi Speed EL II	\$69./	\$2,295.00
Multi Speed HO	\$99./	\$3,695.00
SHARP		
PC 4502	\$55./	\$1,795.00
PC 4521	\$85./	\$2,995.00
TOSHIBA		
T1000	\$39./	\$1,199.00
T1200	\$99./	\$3,499.00
T3100-20	\$99./	\$4,699.00
T3200	\$125./	\$5,799.00
T5100	\$159./	\$7,499.00

from \$69.^{mo}

386 MODEL #5701

• 16-30MHz Processor Speed
• Intel 80386 Microprocessor
• 32 Bit Architecture • Compatible with 8MHz 80286 Hardware & Software • Bios • Speed Selection • Relocation of Bios • EGA Bios to 32 Bit High Speed RAM for Lightning Execution
• Real Time Clock • 4, 8 or 10MHz 80287 Co-processor Socket • Standard 32 Bit • 0-16 RAM Available • Connectors for Attaching up to 16MB of Memory • 1.2MB Half/Height Floppy Drive • Eight Expansion Slots • Serial/Parallel Adeptor • AT Enhanced Keyboard.
RETAIL VALUE \$8999
OUR PRICE \$2249
"STAND UP" Style Optional

Now With Over 2,500
Service Centers Nation Wide
TO FULLY SERVE YOU*

IBM PC/XT/AT are registered trademarks of IBM, Inc.



JUST SAY CHARGE IT!
ADD 3.95% FOR MC/VISA
TO ORDER TOLL FREE CALL
1-800-825-7283
TOLL FREE TECH LINE
1-800-237-5758
CUSTOMER SERVICE
(813) 886 8631

CORPORATE OFFICE 15240 RACE TRACK ROAD
TAMPA FL 33626 (813) 886 8631

OPEN MON. - SAT. 9 AM - 8 PM

1-800-825-SAVE

**OVER
40,000
CUSTOMERS**

PRICES AND PAYMENTS ARE SUBJECT TO CHANGE WITHOUT NOTICE
VOID WHERE PROHIBITED BY LAW \$25.00 CREDIT APPLICATION FEE
*AVAILABLE ON EXTENDED CARE PLAN ***OPTIONAL ON SELECT EQUIPMENT

PC WORLD 03/89

Circle 12 on reader service card

Let There Be Standards

*Brian
Livingston*



Get ready—the 486s are coming.

This year we'll see implementations of Intel's 80486 microprocessor, with power greater than some mainframes. Of course, you aren't likely to need that much muscle unless you're the kind of person who's installed a particle accelerator to run physics experiments in your basement.

On the other hand, there's nothing to stop power users with enough change in their jeans from claiming machines of this generation as their new personal standard, as we've seen happen with every previous generation of so-called screamers.

There is one potential threat, however, to the rise of the 486 in computerland. With all this power, makers of new 486 systems will be tempted to customize a feature here or optimize a subsystem there, as happened with 386 memory boards, which differ from manufacturer to manufacturer.

If each system maker—rushing to be first with the fastest—designs disk controllers, communications boards, or video adapters that work only with their own particular add-in slot, the resulting lack of standardization could make buyers keep their wallets in their pockets.

So far, hardware standardization appears to be proceeding

apace. The industry seems to be settling on two bus designs for the 486 generation: the Micro Channel Architecture (MCA) of IBM's PS/2 systems, and the Extended Industry Standard Architecture (EISA). The latter is being supported by dozens of major manufacturers of compatibles, led by Compaq.

But while most of the industry appears to be heeding the call of standardization, there are still disturbing signs that proprietary thinking may rear its ugly head. For example, at last fall's COMDEX, Acer Technology displayed a 386 machine with two new 32-bit slots—not just for memory boards but for other high-speed peripherals as well. These slots are not compatible with MCA or EISA; boards for this supplier's system will not be interchangeable with those from any other manufacturer.

This strategy isn't likely to catch on. But if it does, and more manufacturers go their own way with proprietary gimmicks, the wide availability of interchangeable add-in PC boards that we now enjoy will be significantly diminished.

To encourage manufacturers of 486-based systems to work toward standardization, volume buyers of microcomputer systems have formed a 486 Stan-

dardization Committee. Committee members don't care whether the industry standardizes on a Purple Polka-Dot Architecture, as long as it works.

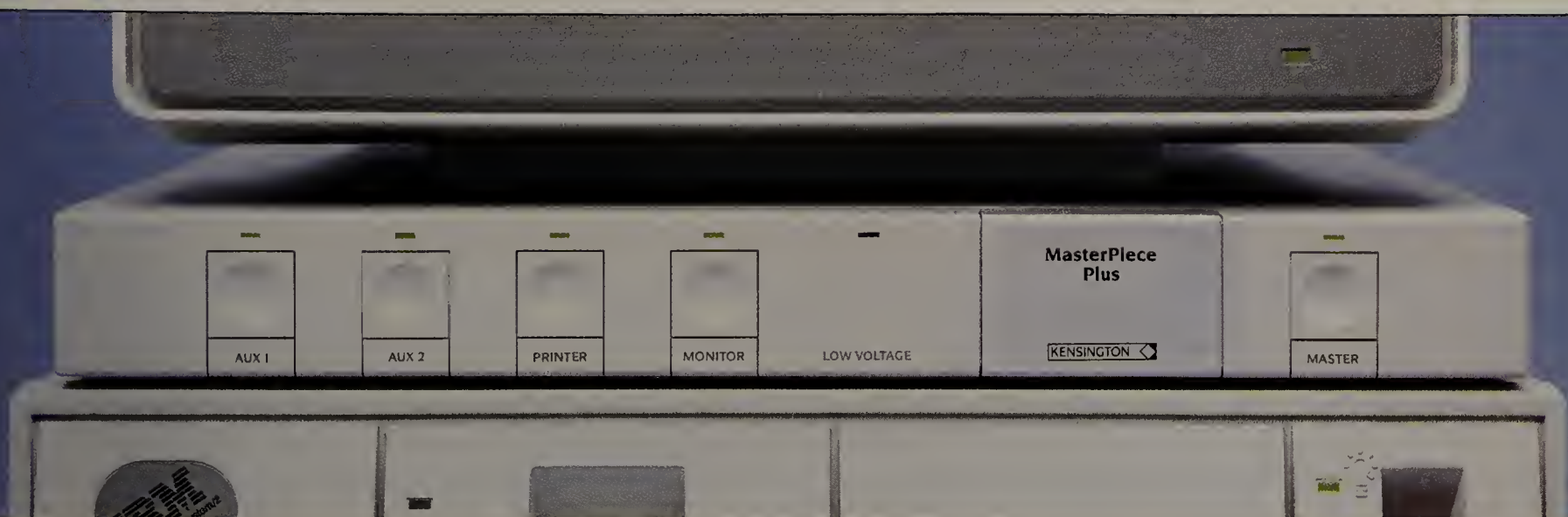
The consensus seems to be that if no single standard will dominate, having two different standards is much better than having no common ground at all. In fact, although MCA and EISA do almost exactly the same things, the competition between them for market share may even result in some benefits to consumers—lower prices, for example.

But the situation bears watching. Even though most vendors seem to be adhering to standards in the 486 generation, the temptation to introduce proprietary technology is always there. I'm sure that locked away in one of Intel's labs somewhere is a team of hotshot engineers—the types who balance their checkbooks in hexadecimal—furiously designing the 586. ●

Brian Livingston chairs the 486 Standardization Committee and is a connectivity specialist for General Electric Consulting Services in New York City.

Have a different perspective? Write Dan Lavin, user ombudsman, PC World, 501 Second St., San Francisco, CA 94107.

Give us an inch...

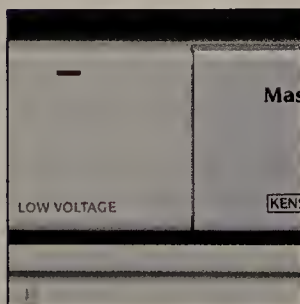


...and we'll give you complete power control. MasterPiece® Plus

Master Piece Plus gives you everything you need to organize and protect your personal computer system. It offers five outlets, a master switch, surge suppression, noise filtering, static protection, a low voltage indicator, modem protection, and a swivel — all in one elegant unit just an inch and a half high.

Master Piece Plus blends in perfectly with any system. Just slide it between your monitor and system unit, and plug your equipment into its five outlets for complete control. Its master switch lets you power up everything at once, and its individual switches let you control your peripherals separately. Touch the master switch to shut down and you'll never accidentally leave anything running overnight.

Master Piece Plus also offers the most complete protection available. Its heavy duty surge suppression



circuitry exceeds strict UL and IEEE specifications. Its noise filtering circuitry protects against EMI and RFI. Its two protected phone jacks defend your modem (and PC) against surges and spikes on the phone line. Its nameplate dissipates harmful static whenever you touch it. And its unique low voltage indicator alerts you when your power level drops below the safety of 104 Volts, to warn you of dangerous low power conditions.

Master Piece Plus even has a hidden swivel that lets you adjust the angle of your monitor. (Easily detachable if your monitor already has a built-in swivel.)

Master Piece Plus — the only complete power center — only \$159.95. Call 800-535-4242 or 212-475-5200 for a Kensington dealer near you. Or write to Kensington, 251 Park Avenue South, New York, NY 10010.

KENSINGTON ®

*Setting new standards
of performance.*

The Experts in Accessories

CURTIS



Printing Made Easy.
Universal Printer Legs: Fits any desktop printer, stores paper underneath. Made in U.S.A., Lifetime Warranty. #PS-2 Retail...\$12.95



Fixing Made Easy.
Computer Tool Kits: Demagnetized tools to repair, maintain, upgrade any computer system, zippered vinyl case, Lifetime Warranty. #TK-1 (11 Tools) Retail...\$29.95; #TK-2 (52 Tools) Retail...\$79.95



Protection Made Easy.
Electronic Surge Protectors: Curtis Jewels, Diamond, Emerald, Sapphire, Ruby, offer protection for valuable equipment against power line "surges, spikes and glitches." Hot to neutral and ground protection, EMI-RFI filtering available, UL Listed, 1449, CSA Approved, Lifetime Warranty. Retail \$59.95-\$99.95



Protection Made Easy.
Safe-Strips: Six multi-purpose outlets, 7 ft. power cable, hot to neutral protection, EMI-RFI filtered and unfiltered available, UL Listed, 1449, Full 1-Yr. Warranty. #SP-3 Retail...\$29.95; #SPF-3 (Filtered) Retail...\$39.95



Typing Made Easy
Curtis Clip: For every computer user, fits all monitors, uses no desktop space, switches for right or left hand use, includes VELCRO® Brand Fastener, Made in U.S.A., Lifetime Warranty. #CC-1 Retail...\$6.95



Storage Made Easy.
Curtis Files: Organize and protect diskettes, 5 1/4 Files hold 50 diskettes inside, 3 working diskettes outside, 3 1/2 Files hold 40 diskettes inside, 3 working diskettes outside. Locking and unlocking models available. Adjustable divider tabs, smoke-tint cover, built-in transport handle, Made in U.S.A., Lifetime Warranty. Retail...\$9.95-\$12.95

Fourteen Ways To Improve Your Day.

Examine the products above. Each and every one can save you time, money, fatigue, or aggravation. They're not very big. They're not very expensive. But if you work with a computer, they can make your life so much nicer you won't know how you managed without them. Thank you for thinking of Curtis.

Curtis products are available nationally from leading Dealers, Distributors, and Retail Chains.
In Canada: Personal Computer Assoc. Inc., P.O. Box 235, Ajax, ONT, L1S 3C3, (416) 427-6612

For the Curtis dealer nearest you call (603) 532-4123 Ext. 99

Manufacturing Company, Inc.

CURTIS

30 Fitzgerald Drive, Jaffrey, NH 03452
A subsidiary of Rolodex Corporation